



# **BYLAAG N**

## **WERKONTLEDINGS**

**(“JOB DESCRIPTIONS”)**

# JOB PROFILE

## Senior Software Developer



### Section A: General Information

Surname		Initials	
Date Appointed		Employee No.	
Company / BU		Department	

**Title Descriptor:** Senior Software Developer

Works on **large and complex projects** or modules of projects, codes and debugs new software products. Responsible for the development of software through co-ordination of a group of programmers – acts as a project/team leader.

**Job Family:** Software Developer

This job family involves the development of software/systems in respect of the planning, writing, testing, implementation, maintenance of new and existing software products or systems. Covers all phases of the System Development Life Cycle (SDLC).

This job family includes:

- Development
- Testing
- Technical Writing

**Level Descriptor:** Level 3 – Supervisor / Fully Skilled Senior Practitioner

This level will normally only be achieved after clear evidence is available of full competence in a specialised technical role. At this level, full technical accountability for work done and decisions taken is expected. The ability to give technical or team leadership should be present as well as a high degree of technical versatility and broad industry knowledge. The essential characteristics are:

1. Takes responsibility either for substantial technical decision-making or for teams of staff. If the latter, demonstrates the basic qualities associated with team leadership.
2. Is thoroughly familiar with the available tools, methods, procedures and/or equipment associated with specialisation. Possesses adequate technical depth to make correct choices from alternatives in all these areas.
3. Is able to apply selected technical tools etc in such a way as to meet set targets of cost, time, quality and performance.
4. Is able to communicate effectively both formally and informally with all those with whom working interfaces arise whether they be colleagues, clients or customers.
5. Possesses a clear understanding of the relationship of any specialised role to the context in which the work is carried out. More generally, this understanding applies also to the employer's business and the needs of those who will use the end product of the work.
6. Shows initiative and makes time available to ensure general technical competencies and specialisations are kept up-to-date in line with industry developments.

For HR Administration use only					
Job Title	Senior Software Developer	Full Job Name	Senior Software Developer		
Job Function	Software Development	Job Number	3	Supervisor/Fully Skilled Senior Practitioner	
Position Number		Skill	Job Category	TA	
Grade	JE Manager – Administered by		Date	Result	
C Upper					

### Section B: Reports To

Company / Business Unit	Department	Title

**JOB PROFILE**  
**Senior Software Developer**



**Section C: Duties and Responsibilities**

*(Delete Roles and/or Tasks that are not applicable. Define and add Tasks where required.)*

	Roles	Tasks	Level/Standard
1	Business Analysis	<p>Works with colleagues and clients/users to investigate and model business functions, processes, information flows and data structures, using methodical and consistent techniques.</p> <p>Works with clients/users to investigate operational requirements and problems, seeking effective business solutions through improvements in information systems, data management, processes/procedures, organisation and equipment. Ensures that account is taken of any potential safety-related aspects of work undertaken, using appropriate techniques, tools and methods.</p> <p>Working alone or as part of a team, analyses the underlying issues arising from investigations into requirements and problems, and identifies available options for consideration.</p> <p>Works with clients/users in specifying information flows, processes/procedures, and data objects that will meet the business requirements. Consults with IS specialists in areas such as software engineering, data management, communications, and service delivery and takes account of their recommendations.</p> <p>Applies available standards, methods and tools in an intelligent and effective way, and produces a consistently high standard of documentation of both a technical and a descriptive nature.</p> <p>Arranges, prepares and conducts meetings, workshops and presentations for a wide variety of audiences, demonstrating consistently high qualities of communication and persuasive skills.</p>	
2	Change Management	<p>Produces schedules of requests for change (RFCs) for managing changes to the live infrastructure.</p> <p>Administers the change management database, ensuring accuracy and consistency of data.</p> <p>Maintains links to clients/users to resolve queries.</p> <p>Interrogates the change management database to produce reports for bodies that review changes, such as change advisory boards (CABs), and for clients/users and management.</p> <p>Contributes to the development of change management procedures.</p> <p>Acts as secretary to meetings that review changes, such as change advisory boards (CABs), providing all necessary documentation relating to the status of changes and produces minutes recording decisions made.</p>	

**JOB PROFILE**  
**Senior Software Developer**

	Roles	Tasks	Level/Standard
3	Systems Design	<p>Working alone on moderately complex systems or with colleagues on larger or more complex systems, produces outline system specifications covering for example: objectives, scope, constraints (such as performance, resources etc.), hardware, network and software environments, main system functions and information flows, data load and implementation strategies, phasing of development, requirements not met, and alternatives considered.</p> <p>Working alone or with colleagues, specifies user/system interfaces, including for example: menus, screen dialogues, inputs, reports, validation and error correction procedures, processing rules, access, security and audit controls, recovery routines and contingency procedures.</p> <p>Translates logical designs into physical designs taking account of target environment, performance requirements, existing systems and any potential safety-related aspects. Produces detailed designs including for example: physical data flows, file layouts, common routines and utilities, program specifications or prototypes, and backup, recovery and restart procedures.</p> <p>Documents all work using required standards, methods and tools, including prototyping tools where appropriate. Provides guidance to less experienced colleagues as required.</p>	
4	Documentation/Technical Authoring	<p>Acquires information about users and information systems by handling actual products, reading technical specifications created by development staff and interviewing development, sales, marketing and support staff. Determines the documentation needs of users. Designs overall documentation package plans including estimates of effort required for execution.</p> <p>Manages, schedules and monitors work of small teams of authors working on documentation for specific projects or products.</p> <p>Organises reviews of draft material. Consolidates comments from reviews (technical, editorial, commercial) and prepares further drafts as necessary. Organises final review and testing of each documentary item.</p> <p>Assists less experienced colleagues with the organisation of reviews and the incorporation of comments.</p> <p>Ensures that other functions (e.g. development, testing) are aware of progress against schedule of documentation work. Where necessary negotiates changes to schedules and dependencies.</p> <p>Ensures that all team members are aware of and work to relevant standards (e.g. BS7649) and have a thorough understanding of appropriate standards and legislation, particularly as they are implemented within own organisation.</p>	
5	Data Analysis	<p>Leads the investigation of corporate data requirements, documenting them according to the required standards utilising the prescribed methods and tools.</p> <p>Either alone or as leader of a small team, applies data analysis and data modelling techniques, based upon a detailed understanding of the corporate information requirements, to establish, modify or maintain data structures and their associated components (entity descriptions, relationship descriptions, attribute definitions). Provides advice and guidance to database designers and others using the data structures and associated components.</p> <p>In liaison with the information resource management or IS management functions, contributes to the development and maintenance of corporate data standards.</p>	

**JOB PROFILE**  
**Senior Software Developer**



Roles		Tasks	Level/Standard
6	Problem Management	<p>Obtains diagnostic data to assist in the investigation and resolution of problems. Matches unresolved incidents against existing problems, known errors and other incidents. Ensures that incidents and problems in systems and services are fully documented within the configuration management defect/problem reporting system.</p> <p>Classifies and prioritises unresolved incidents. Initiates and co-ordinates investigations to discover root causes, and progresses the implementation of remedial action. Ensures that investigations are fully documented, to facilitate the optimum implementation of remedies.</p> <p>Ensures that existing problems and known errors in systems and services being brought into operation are understood and managed in the same way as those arising from operational incidents. Ensures that the requirements of agreed internal and/or external levels of service are met.</p> <p>Keeps relevant staff informed of the status of systems and services, by producing reports/registers on defect/problem reporting data extracted from the configuration management system. Ensures that agreed actions relating to problem investigation and clearance are taken within the allotted timescales.</p> <p>Assists in the analysis of incidents and problems to show trends and potential problem areas, so that action can be taken to minimise the occurrence of incidents and to improve the process of problem reporting, analysis and clearance. Monitors plans and actions to investigate and resolve incidents and problems, including any suppliers and specialists involved, and contributes to problem management policy decisions</p>	
7	Porting/Software Integration	<p>Provides expert technical knowledge in the configuration of software and equipment for the systems testing of platform specific versions of one or more software products.</p> <p>Provides expert technical knowledge in the systems testing of platform specific versions of the software product(s), documenting faults, implementing resolutions and retesting to agreed standards. Reports the outcome of the testing and highlights potential improvements to the process.</p> <p>Provides information to user support and help desk functions to assist in resolving customer problems.</p>	
8	Project Management	<p>Defines, documents and executes small-scale projects, actively participating in all phases of the project. Identifies, assesses and manages risks to the success of the project.</p> <p>Estimates costs, timescales and resource requirements for the successful completion of each project to agreed terms of reference.</p> <p>Prepares and maintains project and quality plans and tracks activities against the plan, providing regular and accurate reports to IS and client management as appropriate.</p> <p>Monitors costs, timescales and resources used, and takes action where these deviate from agreed tolerances. Ensures that delivered systems are implemented within these criteria.</p> <p>Manages the change control procedure gaining agreement for revisions to the project from project sponsors.</p> <p>Provides effective leadership to the project team ensuring that team members are motivated and developing their skills and experience.</p>	

**JOB PROFILE**  
**Senior Software Developer**

Roles		Tasks	Level/Standard
9	Project Office	<p>Develops and maintains generic project management standards, processes and procedures.</p> <p>Supports the setting up of individual project processes and procedures.</p> <p>Supports the use of planning, estimating, tracking and risk analysis tools and techniques.</p> <p>Provides generic and specific support for the development and content of business cases, project plans, and review and audit reports.</p> <p>Evaluates project performance and recommends changes where performance is found to be unsatisfactory.</p>	
10	Programming/Software Creation	<p>Allocates programmers to pieces of work, taking account of individuals' abilities and the requirements of the work.</p> <p>Oversees performance of programming resources, reports on their effectiveness and takes action to remedy deficiencies.</p> <p>Puts in place mechanisms and procedures for the structured review of work produced and ensures that these are adhered to.</p> <p>Establishes and maintains organisational standards in the programming area.</p>	
11	Research	<p>Agrees research goals and generates original and worthwhile ideas in a specialised field within information systems.</p> <p>Reviews and constructively criticises own ideas and those of others.</p> <p>Develops own ideas, or the ideas of others, making all the necessary observations and tests and carrying them through to a full practical demonstration, wherever viable and feasible.</p> <p>Presents papers at conferences and writes journal papers of publication quality.</p> <p>Leads technical "brainstorming" sessions.</p>	
12	Service Level Monitoring	<p>Provides regular reports on actual service levels achieved compared with the targets set in SLAs.</p> <p>Selects monitoring tools to integrate and analyse the basic information and present it in comparison to SLA requirements in a manageable and meaningful format.</p> <p>Organises regular review meetings between service providers and users.</p> <p>Makes proposals to management for changes and improvements to SLAs.</p>	
13	Systems Testing	<p>Takes responsibility for the systems testing function within a systems development department or project. Allocates systems testers to pieces of work, taking account of individuals' abilities and the requirements of the work.</p> <p>Supervises the performance of systems testers, reports on their effectiveness and takes action to remedy deficiencies.</p> <p>Defines testing strategies for a systems development department or project.</p> <p>Directs and carries out investigations to find suitable systems testing tools and methods. In consultation with senior systems development colleagues, decides which should be adopted and how they should be implemented.</p> <p>Ensures that all systems test plans are appropriately reviewed. Personally reviews the more complex and critical plans.</p> <p>Provides authoritative advice and guidance to colleagues on any aspect of systems test planning and execution.</p>	

**JOB PROFILE**  
**Senior Software Developer**



Roles		Tasks	Level/Standard
14	User Support	<p>Assists in the solving of business problems by providing detailed personal advice and guidance to all levels of users in the expert use of systems, products and services available to them; demonstrates ingenuity in applying knowledge to complex and non-standard situations.</p> <p>Assists users experiencing difficulties in using information systems, products or services, including situations referred by more junior staff, investigating complex situations to diagnose underlying causes. Implements known on-site solutions and workarounds and assists users to recover and continue operation.</p> <p>For all requests that cannot be directly resolved, provides an effective interface between users and service providers. Uses judgement in applying guidelines for setting priorities for resolution, monitoring progress, and applying escalation procedures for problems not progressing satisfactorily. Handles all complaints efficiently and professionally.</p> <p>Proposes, discusses and evaluates potential solutions with service providers and implements agreed field modifications or workarounds.</p> <p>In consultation with users, demonstrates all features, plans requirements, installs (including field modification) and commissions desk-top systems, products and services and their upgrades.</p>	
<p><b>Custom Defined Roles and Tasks</b> <i>(Define and add Roles and Tasks where required. Use the ISM for IT-specialist positions.)</i></p>			

# JOB PROFILE

## Operator



*Sections A, B and C of the Job Profile must be attached to the Employment Contract as Annexure A after approval.*

### Section A: General Information

Surname		Initials	
Date Appointed		Employee No.	
Company / BU		Department	

#### Title Descriptor: Operator

Operates and monitors computer equipment on assigned shift. Monitors and controls production environment to meet service commitments ensuring application of installation standards and procedures. Implements changes in accordance with procedures. Ensures effective utilisation of machine resources and prioritisation of workload.

#### Job Family: Customer Support - Operations

This family includes:

- |                    |   |   |
|--------------------|---|---|
| Field Service      | - | Specialists who typically provide hardware related maintenance, diagnosis and repair services directly to customers and on-site |
| Response Centre    | - | technical problem resolution for customers – internal or external   |
| Technical Training | - | the delivery of courses to customers, dealers, distributors or internal staff on company products and services                  |
| Operations         | - | operating and monitoring of computer equipment and production environment; ensures effective utilisation of resources           |

#### Level Descriptor: Level 1 – Standard Entrant

This level is associated with adequately educated trainees or entry-level candidates who are familiar with the scope of their tasks but who do not normally carry supervisory or technical project responsibility. It is distinguished from Trained Practitioner by the depth and complexity of the technical knowledge base covered and the extent to which supervision is required. The essential characteristics are:

- Operates within a structured and routinely supervised environment.
- Is familiar with, and uses as directed, all applicable methods, procedures and standards.
- Is able to function effectively across tasks within scope using available tools, methodologies and/or equipment without frequent reference to others.
- Demonstrates rational and organised approach to tasks set.
- Demonstrates a systematic, disciplined and analytical approach to problem solving.
- Has acquired an appreciation of the context of his/her specific technical role in the relevant area of employment and within the employer's business as a whole.
- Is able to demonstrate effective oral and written communication ability covering all routine activity and contacts.
- Is able to absorb fresh, new technical information rapidly when it is systematically presented and apply it effectively.
- Within a limited time horizon, is able to plan, schedule and monitor own work competently.

#### *For HR Administration use only*

Job Title	Operator	Full Job Name	Operator
Job Function	Customer Support	Job Number	1 Standard Entrant
Position Number	SSkill	Job Category	TA
Grade	JE Manager – Administered by	Date	Result
B			

### Section B: Reports To

Company / Business Unit	Department	Title

**JOB PROFILE**  
Operator

**Section C: Duties and Responsibilities**

*(Delete Roles and/or Tasks that are not applicable. Define and add Tasks where required.)*

Roles		Tasks	Level / Standard
1			
2			
<b>Custom Defined Roles and Tasks</b>			
<i>(Define and add Roles and Tasks where required. Use the ISM for IT-specialist positions.)</i>			



**JOB PROFILE**  
**Principal Business Analyst**

**Section A: General Information**

<b>Surname</b>		<b>Initials</b>	
<b>Date Appointed</b>		<b>Employee No.</b>	
<b>Company / BU</b>		<b>Department</b>	

**Title Descriptor:** Principal Business Analyst

Responsible for the analysis of the business function and may assist in the logical design of systems and databases. Requires business application experience with exposure to the information technology function.

**Job Family:** Software Development

This job family involves the development of software/systems in respect of the planning, writing, testing, implementation, maintenance of new and existing software products or systems. Covers all phases of the System Development Life Cycle (SDLC).

This job family includes:

- Business Analysis
- Development
- Testing
- Technical Writing

**Level Descriptor:** Level 4 – Junior management / Experienced Principal Practitioner

This level represents the level associated with the mature, relevantly experienced and fully capable professional. Such a person is fully accountable for work quality whether it be as a technical specialist or line-manager. He/she possesses the background knowledge and experience to take informed and responsible decisions which are both technically sound and take the needs of the organisation fully into account. Characteristics are:

1. Takes full responsibility for all technical decision-making within the scope of the specialisation or takes project responsibility for significant undertakings whether in development, service delivery or support areas.
2. Takes a leading technical role within the area of specialisation and is thoroughly familiar with all applicable tools, methods, procedures and equipment within the area of responsibility. Uses experience to make informed decisions on selection and execution of all technical approaches and is able to give reliable advice across a wide technical field.
3. Shows mature qualities of leadership in meeting targets of time, cost, quality and performance within projects of substantial value to his/her employer.
4. Communicates effectively, both orally and in writing, with subordinates, colleagues, clients and customers at all levels of seniority.
5. Shows mature understanding of the relationship of his/her specialisation and/or project responsibilities to the undertaking as a whole and is able to propose technical solutions within the scope of his/her expertise which fully take into account the needs of all those who will come into contact with the operational product.
6. Shows initiative and makes time available to ensure general technical competencies and specialisations are kept up-to-date in line with industry developments.

**For HR Administration use only**

<b>Job Title</b>	Principal Business Analyst	<b>Full Job Name</b>	Principal Business Analyst
<b>Job Function</b>	Software Development	<b>Job Number</b>	4 Junior Management/ Experienced Principal Practitioner
<b>Position Number</b>	Profes	<b>Job Category</b>	PR
<b>Grade</b>	<b>JE Manager – Administered by</b>	<b>Date</b>	<b>Result</b>
D Lower			

**Section B: Reports To**

<b>Company / Business Unit</b>	<b>Department</b>	<b>Title</b>

**JOB PROFILE**  
**Principal Business Analyst**

**Section C: Duties and Responsibilities**

*(Delete Roles and/or Tasks that are not applicable. Define and add Tasks where required.)*

	Roles	Tasks	Level/Standard
1	Business Analysis	<p>Takes responsibility for investigative work to seek effective business solutions. Organises their implementation through improvements in information systems, data management, processes/procedures, organisation and equipment. Applies and monitors the use of required modelling and analysis tools, methods and standards in an intelligent and effective way.</p> <p>Co-operates with senior client and IS staff as required, conducting investigations at a high level for strategy studies, requirements specifications and feasibility studies. Maintains technical awareness at a level where alternatives can be analysed, modelled and classified according to technical feasibility and performance.</p> <p>Utilises business experience and skills to assess and advise on the practicability of alternatives, marrying up technical limitations with operational realities.</p> <p>Takes responsibility as needed for the detailed specification and modelling of recommended solutions using resources, standards, methods and tools as required. Maintains links with appropriate counterparts within both software engineering and service delivery functions and plays a full part in bringing systems to implementation as detailed by organisation policies and methods.</p> <p>In all assignments, ensures that account is taken of any potential safety-related aspects of IS work undertaken supervising, as called for, the use of specialised techniques, tools and methods in analysis, modelling and design.</p> <p>Plans, arranges and controls meetings, workshops and relations with client/user staff during system investigations and throughout subsequent development work. Takes responsibility at a high level for the proper conduct of such relations.</p>	
2	Change Management	<p>Contributes to the evaluation or establishment of the change management system, ensuring conformance to documentation standards. Maintains the change management system in accordance with agreed procedures.</p> <p>Manages changes to the live infrastructure, taking account of priorities and other changes which may impact on service availability and safety. Provides advice to users on the system of prioritisation and the likely timescales for implementation.</p> <p>Chairs meetings that review changes, such as change advisory boards (CABs), ensuring that changes are expedited to maintain the required infrastructure.</p> <p>Takes executive action under delegated powers, to implement changes considered necessary to ensure a safe and effective infrastructure.</p> <p>Analyses change records to determine trends and problems that occur and seeks rectification with service departments and clients/users.</p> <p>Provides advice to clients/users on the impact of requests for change and ensures that the appropriate impact analyses are carried out before changes are authorised.</p> <p>Provides management information and statistics on the progress of changes to senior management and clients/users, including performance against service Level agreements.</p> <p>Promotes awareness of the importance of a structured change management process, working with other service management functions to ensure effective operation of the change management function and the consistency of procedures.</p>	

**JOB PROFILE**  
**Principal Business Analyst**



	Roles	Tasks	Level/Standard
3	Systems Design	<p>Takes full technical responsibility for all aspects of systems specification and design.</p> <p>Selects, in consultation with more senior management as required, appropriate design standards, methods and tools and ensures they are applied effectively.</p> <p>Takes a leading technical role in systems development projects, both within systems design and in interfaces with other stages of development. Evaluates and undertakes impact analysis on major design options.</p> <p>Ensures all work is documented using the selected standards, methods and tools, including prototyping tools where appropriate. Ensures that designs take full account of specified requirements and constraints, including any potential safety-related aspects, and are appropriate to the target implementation and support environments.</p>	
4	Documentation/Technical Authoring	<p>Assists clients to define their requirements and put together proposals for documentation work.</p> <p>Evaluates the documentation aspects of new business prospects.</p> <p>Develops plans, budgets and tenders for documentation work.</p> <p>Arranges, prepares for and conducts meetings with and presentations to a wide variety of audiences with differing levels of technical understanding, demonstrating consistently high qualities of communication and persuasive skills and ensuring full and accurate records are produced and kept.</p> <p>Identifies hardware/software/training requirements for documentation development systems capable of creating a suitable environment to implement documentation strategy.</p> <p>Advises and trains others on the implementation of documentation standards and procedures, particularly those whose key responsibilities do not include documentation.</p> <p>Advises on appropriate documentation formats and documentation systems to satisfy requirements.</p> <p>Develops standards and procedures to support the implementation of documentation strategy.</p>	
5	Data Analysis	<p>Co-ordinates and manages the investigation of corporate data requirements, documenting them according to the required standards utilising the prescribed methods and tools.</p> <p>Co-ordinates and manages the application of data analysis and data modelling techniques, based upon a detailed understanding of the corporate information requirements, in order to establish, modify or maintain data structures and their associated components (entity descriptions, relationship descriptions, attribute definitions). Ensures that those using the data structures and associated components have a good understanding and that any queries are dealt with promptly and efficiently.</p> <p>Supports the information resource management or IS management functions in the development and maintenance of corporate data standards.</p> <p>Leads the quality assurance of the corporate data structures and associated components (entity descriptions, relationship descriptions, attribute definitions).</p> <p>Contributes to the development and implementation of the data management policy within the organisation.</p>	

**JOB PROFILE**  
**Principal Business Analyst**



Roles		Tasks	Level/Standard
6	Porting/Software Integration	<p>Leads a project team in the configuration of software and equipment for the systems testing of platform specific versions of one or more software product(s) and documents relevant details to agreed standards.</p> <p>Leads a project team in the systems testing of platform specific versions of the software product(s), documenting faults, implementing resolutions and retesting to agreed standards. Reports the outcome of the testing and highlights potential improvements to the process.</p> <p>Provides expert information to user support and help desk functions to assist in resolving customer problems.</p> <p>Provides expert information to systems testing and quality assurance functions to assist in the development of more effective systems testing and quality assurance procedures.</p>	
7	Project Office	<p>Develops, reviews and maintains project management strategy, standards, processes, procedures, tools and techniques.</p> <p>Provides in depth project management advice and assistance to strategic projects, where necessary.</p>	
8	Research	<p>Constructs the technical and non-technical contents of research proposals, including the research goals, for submission to the appropriate bodies.</p> <p>Advises on the technical viability and appropriateness of research proposals submitted by others.</p> <p>Supervises the work of a research team.</p> <p>Gains an appreciation of current research work over a wide area of information systems and acquires a deep knowledge of more than one specialised field or is a leading expert in a single specialist field.</p> <p>Frequently communicates with peers in other organisations and/or in other countries, eg by attending conferences, helping to run special interest organisations.</p>	
9	Service Level Monitoring	<p>Takes responsibility for the provision of adequate, accurate and timely reports on actual service levels achieved compared with the targets set in SLAs. Ensures that significant failures to meet target are brought to the attention of problem management or other appropriate service provider management functions.</p> <p>Liaising with management and specialists as necessary, selects appropriate tools to monitor, analyse and report on actual performance in comparison to SLA requirements in a manageable and meaningful format.</p> <p>Liaises regularly with service providers and users to review and improve performance against SLA.</p> <p>Negotiates changes and improvements to SLAs with the agreement of service provider and user management.</p> <p>Together with service provider and user management, undertakes major reviews of SLAs, and the production and agreement of new SLAs and extensions to existing SLAs.</p>	

**JOB PROFILE**  
**Principal Business Analyst**

Roles		Tasks	Level/Standard
10	Project Management	<p>Takes responsibility for the definition, documentation and execution of one or more small-scale projects, actively participating in all phases of the project. Identifies, assesses and manages risks to the success of the project.</p> <p>Effectively estimates costs, timescales and resource requirements for the successful delivery of the project(s) to an agreed scope.</p> <p>Ensures that realistic project and quality plans are prepared and maintained and tracks all activities against the plan, providing regular and accurate reports to senior IS management, and client management as appropriate.</p> <p>Monitors costs, timescales and resources used, and takes action where these deviate from agreed tolerances. Ensures that delivered systems are implemented within these criteria.</p> <p>Manages the change control procedure gaining agreement for revisions to the project(s) from project sponsors.</p> <p>Provides effective leadership to the project team ensuring that team members are motivated and developing their skills and experience. Actively represents the project team, ensuring that effective relationships are built and maintained with the business.</p>	
<b>Custom Defined Roles and Tasks</b> <i>(Define and add Roles and Tasks where required. Use the ISM for IT-specialist positions.)</i>			

# JOB PROFILE

## Principal Customer Engineer



*Sections A, B and C of the Job Profile must be attached to the Employment Contract as Annexure A after approval.*

### Section A: General Information

Surname		Initials	
Date Appointed		Employee No.	
Company / BU		Department	

**Title Descriptor:** Principal Customer Engineer

Provides highly specialised technical support and guidance directly to clients and colleagues, responsible for high-level diagnosis and problem solving.

**Job Family:** Customer Support – Field Service

This family includes:

- Field Service - Specialists who typically provide hardware related maintenance, diagnosis and repair services directly to customers and on-site
- Response Centre - technical problem resolution for customers – internal or external
- Technical Training - the delivery of courses to customers, dealers, distributors or internal staff on company products and services
- Operations - operating and monitoring of computer equipment and production environment; ensures effective utilisation of resources

**Level Descriptor:** Level 4 – Junior management / Experienced Principal Practitioner

This level represents the level associated with the mature, relevantly experienced and fully capable professional. Such a person is fully accountable for work quality whether it be as a technical specialist or line-manager. He/she possesses the background knowledge and experience to take informed and responsible decisions which are both technically sound and take the needs of the organisation fully into account. Characteristics are:

1. Takes full responsibility for all technical decision-making within the scope of the specialisation or takes project responsibility for significant undertakings whether in development, service delivery or support areas.
2. Takes a leading technical role within the area of specialisation and is thoroughly familiar with all applicable tools, methods, procedures and equipment within the area of responsibility. Uses experience to make informed decisions on selection and execution of all technical approaches and is able to give reliable advice across a wide technical field.
3. Shows mature qualities of leadership in meeting targets of time, cost, quality and performance within projects of substantial value to his/her employer.
4. Communicates effectively, both orally and in writing, with subordinates, colleagues, clients and customers at all levels of seniority.
5. Shows mature understanding of the relationship of his/her specialisation and/or project responsibilities to the undertaking as a whole and is able to propose technical solutions within the scope of his/her expertise which fully take into account the needs of all those who will come into contact with the operational product.
6. Shows initiative and makes time available to ensure general technical competencies and specialisations are kept up-to-date in line with industry developments.

**For HR Administration use only**

<b>Job Title</b>	Principal Customer Engineer	<b>Full Job Name</b>	Principal Customer Engineer	
<b>Job Function</b>	Customer Support	<b>Job Number</b>	4	Junior Management/Experienced Principal Practitioner
<b>Position Number</b>	PROFES	<b>Job Category</b>	PR	

**JOB PROFILE**  
**Principal Customer Engineer**



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UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA



**AFRICA**

PERSETEL Q DATA AFRICA (Pty) LTD

Grade	JE Manager – Administered by	Date	Result
D Lower			

**Section B: Reports To**

Company / Business Unit	Department	Title

**JOB PROFILE**  
Principal Customer Engineer

**Section C: Duties and Responsibilities**

*(Delete Roles and/or Tasks that are not applicable. Define and add Tasks where required.)*

Roles	Tasks	Level / Standard
1 Configuration Management	<p>Evaluates existing CM systems and designs, implements, manages and continually verifies new/improved systems, through internal audits in liaison with other functions. Estimates and plans the work and resources involved, and monitors and reports on progress against plan and according to standards.</p> <p>Produces or delegates production of requisite CM standards and procedures, such as the CM plan, problem/defect reporting procedures, change control procedures, etc, ensuring their compatibility with prescribed standards (eg ISO 9001, CMM).</p> <p>Evaluates proprietary CM tools and recommends those which best meet the organisation's budget, resources, timescale and technical requirements, in liaison with other functions as appropriate.</p> <p>Customises or delegates customisation of proprietary tools to produce an effective CM environment in terms of database and software library, workflow and report generation.</p> <p>Presents the principles of CM to clients and/or sub-contractors. Liaises with these organisations in all matters relating to CM, including attendance at configuration control board (CCB) meetings (or equivalent), the determination and documentation of CM requirements, and the review and audit of sub-contractor CM systems.</p> <p>Plans and monitors the production of CIs and their structures and inter-relationships. Monitors builds and releases of software, in liaison with applicable technical functions. Plans and monitors all baselines for formal test and delivery, in liaison with project management and other relevant functions, throughout the IS life cycle.</p>	
2 Change Management	<p>Contributes to the evaluation or establishment of the change management system, ensuring conformance to documentation standards. Maintains the change management system in accordance with agreed procedures.</p> <p>Manages changes to the live infrastructure, taking account of priorities and other changes which may impact on service availability and safety. Provides advice to users on the system of prioritisation and the likely timescales for implementation.</p> <p>Chairs meetings that review changes, such as change advisory boards (CABs), ensuring that changes are expedited to maintain the required infrastructure.</p> <p>Takes executive action under delegated powers, to implement changes considered necessary to ensure a safe and effective infrastructure.</p> <p>Analyses change records to determine trends and problems that occur and seeks rectification with service departments and clients/users.</p> <p>Provides advice to clients/users on the impact of requests for change and ensures that the appropriate impact analyses are carried out before changes are authorised.</p> <p>Provides management information and statistics on the progress of changes to senior management and clients/users, including performance against service Level agreements.</p> <p>Promotes awareness of the importance of a structured change management process, working with other service management functions to ensure effective operation of the change management function and the consistency of procedures.</p>	

**JOB PROFILE**  
**Principal Customer Engineer**

Roles		Tasks	Level / Standard
3	Emerging Technology Monitoring	<p>Reviews product release notices, academic research and other learned publications to identify emerging technologies in IS areas of interest to the organisation.</p> <p>Assesses the potential benefit to the organisation of specific hardware or software developments or products. Investigates these in detail, recognises further avenues of research and identifies early users, if any.</p> <p>Assesses likely products and developments and their applicability within an overall IS strategy and their potential to influence the IS strategy.</p> <p>Presents reports and (optionally) makes presentations to IS management and relevant functional management on emerging technologies.</p>	
4	Project Office	<p>Develops, reviews and maintains project management strategy, standards, processes, procedures, tools and techniques.</p> <p>Provides in depth project management advice and assistance to strategic projects, where necessary.</p>	
5	Research	<p>Constructs the technical and non-technical contents of research proposals, including the research goals, for submission to the appropriate bodies.</p> <p>Advises on the technical viability and appropriateness of research proposals submitted by others.</p> <p>Supervises the work of a research team.</p> <p>Gains an appreciation of current research work over a wide area of information systems and acquires a deep knowledge of more than one specialised field or is a leading expert in a single specialist field.</p> <p>Frequently communicates with peers in other organisations and/or in other countries, eg by attending conferences, helping to run special interest organisations.</p>	
6	Service Level Monitoring	<p>Takes responsibility for the provision of adequate, accurate and timely reports on actual service levels achieved compared with the targets set in SLAs. Ensures that significant failures to meet target are brought to the attention of problem management or other appropriate service provider management functions.</p> <p>Liaising with management and specialists as necessary, selects appropriate tools to monitor, analyse and report on actual performance in comparison to SLA requirements in a manageable and meaningful format.</p> <p>Liaises regularly with service providers and users to review and improve performance against SLA.</p> <p>Negotiates changes and improvements to SLAs with the agreement of service provider and user management.</p> <p>Together with service provider and user management, undertakes major reviews of SLAs, and the production and agreement of new SLAs and extensions to existing SLAs.</p>	

**JOB PROFILE**  
**Principal Customer Engineer**

Roles		Tasks	Level / Standard
7	Sales Support	<p>Takes full technical responsibility - either individually or by leading a team - for assisting customers in clarifying their needs and requirements for new and enhanced systems, products and services, and devising effective solutions to these needs, giving due consideration to any safety-related aspects which may apply. Assesses the feasibility and practicality of potential approaches, specifies requirements and establishes decision criteria.</p> <p>Either individually or by leading a team, produces reliable cost, effort and risk estimates and project plans, and documents these and the conclusions reached to provide the technical content of sales proposals, taking full responsibility for these parts of the proposals.</p> <p>Demonstrates the technical feasibility of proposed solutions, especially where integration of diverse hardware and software is involved, by producing suitable physical or simulation models, probably leading a team.</p> <p>Takes responsibility for demonstrating, installing (including field modifications) and commissioning hardware/software systems, products and services and their upgrades.</p> <p>Manages the sales support activities, taking full responsibility for the quality and timeliness of the technical content of bids and sales proposals, including the planning of own work and that of more junior staff.</p> <p>Establishes metrics to help with monitoring and continuous improvement of the sales support activities, and provides timely and accurate data on performance</p>	
8	Technical Authority	<p>Assists project management to prepare outline and detailed technical plans and co-operates with business assurance and project office staff to ensure that appropriate technical resources are allocated.</p> <p>Advises systems development management and staff on system development methods and tools, including the technical aspects of configuration management methods, system security requirements (confidentiality, integrity and availability), the operational and maintenance aspects of the system under development, and the proposed system recovery procedures. Ensures that relevant technical strategies, policies, standards and practices are applied appropriately.</p> <p>Ensures that appropriate technical records are established and maintained and that technical assurance control methods are used appropriately.</p> <p>Monitors technical progress, informing project management of major technical issues and making recommendations on their resolution.</p> <p>Advises on appropriate quality criteria, and the conduct of quality reviews of technical products. Attends quality reviews (whenever appropriate) and ensures the adequacy and effective use of quality control procedures.</p> <p>Advises on the impact of technical exceptions (including requests for changes, deviations from specifications, etc), and ensures that there is proper assessment of all technical exceptions. Assists project management to devise recovery actions.</p> <p>Assists project management to prepare technical aspects of reports, and contributes to formal reviews and evaluations when projects and programmes end.</p>	

**JOB PROFILE**  
**Principal Customer Engineer**

Roles		Tasks	Level / Standard
9	User Support	<p>Ensures that all requests from users for assistance are handled promptly and effectively; is pro-active to ensure that users make effective use of the facilities available to them.</p> <p>Demonstrates commitment and ingenuity in expert application of available facilities to non-standard situations, diagnosing underlying causes of difficulties, and devising solutions or workarounds to ensure that the effect on operations is minimised.</p> <p>For all requests that can not be directly resolved, provides an effective interface at the highest level between users and service providers; ensures that priority setting and escalation procedures are applied effectively and that all complaints are responsibly and professionally resolved.</p> <p>Regularly monitors the incidence, status and speed of resolution of enquiries and problems; is pro-active in devising improvements and recommending changes to systems, products or services.</p> <p>Provides users with information on the medium and long-term plans and policies of the organisation for the provision of desk-top systems, products and services and advises on the impact of such plans.</p>	
<p><b>Custom Defined Roles and Tasks</b> (Define and add Roles and Tasks where required. Use the ISM for IT-specialist positions.)</p>			


**CORE JOB DESCRIPTION: JUNIOR LAN SUPPORT TECHNICIAN**

LEVEL	JOB TITLE	MINIMUM QUALIFICATION	MINIMUM EXPERIENCE	PURPOSE OF JOB AND CORE DESCRIPTION
40	Junior LAN support technician	Matric and Computer Fundamentals	1 Year applicable experience with the support of workstations on local area networks coupled with the mainframe and other systems	To maintain and support local area networks under supervision. This entails the following activities: <ul style="list-style-type: none"> <li>• Setup, configuration of workstations and connection of users to the network services they require.</li> <li>• System implementation support</li> <li>• LAN support with regard to access, backup and restore of procedures, virus control, and problems experienced.</li> </ul>

**CORE JOB DESCRIPTION: LAN SUPPORT TECHNICIAN**

LEVEL	JOB TITLE	MINIMUM QUALIFICATION	MINIMUM EXPERIENCE	PURPOSE OF JOB AND CORE DESCRIPTION
50	LAN Support Technician	Matric and Computer Fundamentals and Hardware knowledge	2-3 Years applicable experience with the support of local area networks coupled to the mainframe and other systems	To provide first line maintenance and support of local area networks. This entails the following activities: <ul style="list-style-type: none"> <li>• Setup, configuration and availability of file servers, the setup and configuration of workstations and the</li> </ul>



				<p>connection of the users to the network services they require</p> <ul style="list-style-type: none"> <li>• System implementation support</li> <li>• Provide LAN support with regard to access, system availability, backup and restore procedures, virus control, disk space in-post training and problems experienced</li> <li>• Provide system support with regard to printing and email</li> <li>• monitoring, formal reporting and statistics</li> <li>• Provide client advise with regard to usage of equipment, programs available, usage of applications and problem reporting</li> <li>• Training and development of Junior LAN Support Technicians</li> </ul>
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### CORE JOB DESCRIPTION: SENIOR LAN SUPPORT TECHNICIAN

LEVEL	JOB TITLE	MINIMUM QUALIFICATION	MINIMUM EXPERIENCE	PURPOSE OF JOB AND CORE DESCRIPTION
55	Senior LAN Support Technician	Matric or Applicable Diploma	4 Years applicable experience with the support of local areas networks	To provide centralised or decentralised maintenance and support of local area networks. This entails the following activities:



		or  Applicable Degree	coupled to the mainframe and other systems	<ul style="list-style-type: none"> <li>• System implementation support</li> <li>• Provide LAN support with regard to access, system availability, backup and restore procedures, optimising, virus control, disk space in-post training and problems experienced</li> <li>• Provide specialist System Support with regard to printing and email</li> <li>• monitoring, formal reporting and statistics</li> <li>• Provide client advise with regard to usage of equipment, programs available, usage of applications and problem reporting</li> <li>▪ Training and development of Junior LAN Support Technicians</li> <li>• Quality Assurance</li> </ul>
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## CORE JOB DESCRIPTION: PROGRAMMER

LEVEL	JOB TITLE	MINIMUM QUALIFICATION	MINIMUM EXPERIENCE	PURPOSE OF JOB AND CORE DESCRIPTION
40	Programmer	<p>Matric</p> <p>and</p> <p>formal programming training</p> <p>or</p> <p>Applicable degree</p> <p>or</p> <p>Applicable diploma</p>	1 year in previous position	<p>To perform programming and related tasks. This entails the following activities:</p> <ul style="list-style-type: none"> <li>• Execution of technical investigations</li> <li>• Development and maintenance of software</li> <li>• Provision of technical support and ensuring technical stability</li> <li>• Communication with relevant parties</li> <li>• Quality assurance</li> </ul>

## CORE JOB DESCRIPTION: SENIOR PROGRAMMER

LEVEL	JOB TITLE	MINIMUM QUALIFICATION	MINIMUM EXPERIENCE	PURPOSE OF JOB AND CORE DESCRIPTION
45	Senior Programmer	<p>Matric</p> <p>and</p> <p>formal programming training</p> <p>or</p> <p>Applicable degree</p>	18 months in previous position	<p>To perform system application programming and related tasks. This entails the following activities:</p> <ul style="list-style-type: none"> <li>• Provision of technical support and ensuring technical stability of application systems.</li> <li>• Development and</li> </ul>



		or Applicable diploma		maintenance of application software • Execution of technical investigations • Integration of applications • Communication with relevant parties • Provide technical training and mentorship • Quality Assurance
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## PRESCRIBED JOB CONTENTS: OCCUPATIONAL CLASS PROGRAMMER

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### NOTA BENE:

The main object of job contents description is to define, by means of basic job description, post levels for the purpose of the creation of posts, and not necessarily to establish detailed duty sheets. Departments must still compile detailed duty sheets for separate posts and keep it up to date complementary to job contents descriptions, for the purpose of application in practice.

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### PART II: POST CLASS ASSISTANT PROGRAMMER

1. Undergo structured, scheduled and systematised training.
  2. Perform a variety of practical tasks under direct supervision in order to prepare himself/herself for the duties and responsibilities attaching to the post class Programmer.
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### PART II: POST CLASS PROGRAMMER

1. Compose computer programmes (including the testing thereof) for the processing, storing and releasing of data.
  2. Maintain computer programs (including the adjustment thereof to adapt to changing circumstances).
-



### PART III: POST CLASS SENIOR PROGRAMMER AND PRINCIPAL PROGRAMMER

1. Compose computer programmes (including the testing thereof) for the processing, storing and releasing of data.
  2. Maintain computer programs (including the adjustment thereof to adapt to changing circumstances).
  3. Render an advisory service to management on demand.
  4. Supervise and guide junior personnel, including the organising of duties and the controlling of work.
- 

### PART IV: POST CLASS CHIEF PROGRAMMER

1. Compose computer programmes (including the testing thereof) for the processing, storing and releasing of data.
  2. Maintain computer programs (including the adjustment thereof to adapt to changing circumstances).
  3. Develop new computer programmature to adapt to client's needs.
  4. Render an advisory service to Management.
  5. Make suggestions according to which programmature problems can be eliminated.
  6. Supervise and guide subordinate personnel (including the organising of work).
  7. Assist with budget control (including the compilation of the budget).
  8. Give direct training to personnel.
- 

### PART V: POST CLASS CONTROL PROGRAMMER

1. Render an advisory service to management.
2. Overall control over the utilisation and application of programmature and personnel.
3. Supervise and guide subordinate personnel (including the organising of work and controlling of work outputs).
4. Apply budget control as far as computer operation is concerned.
5. Identify training needs and organise for the presentation of training.
6. Identify programmature problems, rectify problems (where possible); organise for rectifying problems.



## **BYLAAG O**

### **PROGRAMMERINGSVAARDIGHEDE (INLIGTING INTERNASIONAAL PER E-POS AANGEVRA)**

## What are the attributes of a programmer?



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UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA

A programmer is someone that has the following attributes:

1. The ability to be creative and innovative

The candidate must be able to create a solution for a problem. This may take the form of creating a new computer program or new procedure to be able to make the task of the client much easier. This will involve working through a problem and finding the best solution to solve the task. This means that the candidate will have to be creative and innovative to achieve this end to allow the client to be more productive.
2. The ability to think logically and laterally

To make a programmer, the candidate will have to be logical and lateral in his / her thought processes and will have to be able to think through and reason out their arguments. They will also have to be open to new ideas and be willing to explore new avenues and have the ability to recognize when these ideas and theories have run their course.
3. The ability to analyze and solve problems

The candidate must have the ability to take a large complex problem and break it down into small manageable and logical units to be able to design a solution.
4. The ability to communicate

This means that the candidate must be able to read and write fluently to be able to interact with clients and other team members. They will also need good verbal skills to perform this task.
5. The ability to work on his or her own or in a team setting.

The candidate must be a strong motivated individual who can work on his / her own or in a team setting and must be willing to ask for help, and give help when assistance is required.
6. The ability to work within time constraints

The candidate must be able to work under pressure and plan and prioritize his / her work and see it through to the end of the project. This would mean that the candidate will have to deliver the solution on or before the specified time and may have to drive the process to achieve this end.
7. Attention to detail

The candidate must be meticulous in his / her work and must pay attention to all detail. The candidate must be able to use various testing methods to be able to get to the ground. Failure to do so will result in the solution not getting of the ground.

8. The willingness to learn new methods, techniques and technologies.

The candidate must be a self-starter. This means that he / she must be motivated and keen to learn on his / her own to expand his / her knowledge and must also be flexible and willing to embrace and handle change and must tackle each with commitment and enthusiasm.

9. Leadership qualities

The candidate should have good leadership qualities to be able to delegate tasks to various members in a team setting and to follow up that these tasks are completed on time.

10. The ability to take criticism

The candidate should be open to criticism and must be willing to give praise where praise is due. He / she should also remember that no one solution is correct.

11. A basic knowledge of arithmetic and algebra

The candidate is required to have a basic understanding of arithmetic and basic algebra to assist him/her in designing solutions.

12. The ability to foresee problem areas.

The candidate needs to have the ability to foresee problems that may arise and be able to make alternative suggestions. This will lead to smooth implementation and continued use of such solutions.

13. A basic understanding of the operating system he / she is working in.

The candidate must know the operating system he / she is working in and know how to be able to use it.

14. A good knowledge of the access technology used by such a person.

The candidate should be familiar with the relevant access technology e.g. Screen reader, screen magnification software he / she is using and have a good working knowledge of the keyboard.

15. Good memory

The candidate must have a good memory because it will not always be possible to be near his / her equipment to take notes. He / she will also need to remember things like program syntax etc.



## Deena Moodley

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**From:** "Laura Eaves" <leaves@VOICENET.COM>  
**To:** <program-l@LISTSERV.NAS.NET>  
**Sent:** 17 June 2001 13:34  
**Subject:** Re: programmer's profile  
Hi Deena --

Some skills I can think of are

- \* ability to think in the abstract
- \* good problem solving skills
- \* ability to think logically

As for prerequisites, I think a good working knowledge of algebra is almost essential. If you're talking about younger students who haven't learned algebra, then some of the logical abstraction skills will need to be taught. I think a child who masters programming will find algebra to be much more natural than a child who has not programmed, and a student who has mastered algebra and other intermediate and advanced math skills, will find programming much easier.

I'd be interested in seeing what you put in your profile.

HTH!

-le



## Deena Moodley

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**From:** "Weber Walter M" <Walter.M.Weber@irs.gov>  
**To:** <deena@sancb.org.za>  
**Sent:** 18 June 2001 14:25  
**Subject:** programmer profile

A programmer: needs to be logical, have patience, be able to work meticulously, be able to look ahead in order to anticipate unspecified problems, be able to back away from a failed solution in order to view a problem from different perspectives so as to come up with fresh solutions, know how to develop thorough testing techniques, and be a self starter.

Thanks,

Walt



**Deena Moodley**

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**From:** "Christian Gerhardt" <Christian\_Gerhardt@t-  
**To:** <deena@sancb.org.za>  
**Sent:** 16 June 2001 10:16  
**Subject:** programmers  
Hi!

My name is Christian and I am studying computer sciences at the University of Hamburg. I am not really sure, if I understood your questions, but I will try to answer them. The skills you need to be successful

You need to be able to analyse sometimes fairly complex problems. There are some programming paradigms, which you need to know, because one would be better to solve a given problem than the other. For example you could solve a problem the object oriented way ore the functionally way. Very important, although many people ddo not like to hear it, are mathematics. So it is more than useful to be relatively well in maths :-). Hope that will help a little. If you are searching for more answers to given questions just send an email.

Bye Christian



## Deena Moodley

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**From:** "Thomas D. Ward" <tward@bright.net>  
**To:** <deena@sancb.org.za>  
**Sent:** 16 June 2001 16:12  
**Subject:** Programmer Profiles.

Hi, well, here are my thoughts and answers based on my experience as a programmer.

- What are the characteristics that some one will need to make a programmer?

Well, based on my own lifeexperience you would need a reasonable amount of higher math skills, someone who is good at problem solving and debugging code, lots of creativity, knows the languages they are working with pretty well, and is not afraid to use multiple operating systems.

- What are the skills they would need to be successful?

Well, I think that any programmer should know the basics of c/cpp, Java, and Visual Basic. This will enable the programmer to be more flexible out in the field.

Second, the programmer should probably decide on what type of applications or software are they interested in specializing in. Often programmers just do games, office programs, scientific applications, accessibility software, and on and on we go.

Choosing the line of work they are most interrested in helps them choose the language they will use, and if there app is able to go multiplatform.

If there apps is c/cpp and Java then investing in Linux/Unix development is probably a good idea since there are better and better Linux's out there such as Mandrake 8 which is becoming popular with many research centers, and home users.

For example Nasa, Bowling, Siscom, and many other places are examples of businesses that have switched to Linux as there primary operating system and it is growing while MS slowly looses there iron grip on the market.

Something else to think about heavily is that Microsoft has burned programmers in the past, and are going to do it again with the XP VS.net development sdk's. Where as Linux is language stable, and changes are not as earth shaking, and you get a lot of source code to look at as an example when creating applications.

You don't get SDK's like you do under MS Windows, but you don't need them with all the source code that comes with Linux.

Lastly, a skilll that helps me is to have a pretty good idea of what the end project will look like and do when completed. This really is harder than one might think. You may spend several days mapping hot keys, deciding where the buttons will go, how it will look to the end user, and thinking of what kinds of functions will you need.

For example when I start a text card game I include a function of my own design called `int randcard ()`.

What it does is randomly generates a number between 1 and 52 or 50 depending on the game and returns an intiger value to the function that called it.

Then, the `void drawcard ()` function uses an If statement to first se if it had been drawn before, and if not compare the value with the known face types and show it as a Queen of Hearts, Jack of Diamonds, Ace of Spades or whatever.

### Summary

I'd like to just sum up what I said. In short nothing makes up for good math, a sence of creativity, able to solve program errors, and the ability to look ahead and see the project in the big picture before working in each little step. Secondly, c/cxx and Java are here to stay as Linux and other operating systems improve and take more of Microsoft's share of the market. developers have too look ahead and see where the market is going for there language.

VB is nice, but it is MS only, and MS now is changing the code and a lot of work is going to be done making old apps foward compatible with the new platform.

Specializing in a software development gives you an idea what books you will need to read, and will allow you to reuse code over and over again between apps.

Example is toomb Rader series. After the creators had all the basic images of Lora Croft, some basic battle seens, and so on it was easy to take the game engine and create a series II, III, and IV.

Well, I hope this has helped and you can use whatever from this info to help you out.



**Deena Moodley**

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**From:** "Gary Wunder" <glwunder@home.com>  
**To:** <deena@sancb.org.za>  
**Sent:** 18 June 2001 15:24  
**Subject:** Programmer qualities

\* Have good basic skills in reading and writing - if you can't read well enough to get at syntax, you will be slow, and if you can't type well, you will likewise be slow.

\* Cannot be intimidated by computers and must see them as powerful but limited machines who do what you tell them.

\* Must have enough people skills to be able to find out what folks need, and then to make them feel good about your finished product. Appearing to be a geek or a chip head does not inspire confidence.

Gary Wunder  
[glwunder@home.com](mailto:glwunder@home.com)  
Home: 573/874-1774  
Work: 573/882-2561

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## Deena Moodley

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**From:** "Granville Gray" <granville.gray@uk.zurich.com>  
**To:** <deena@sancb.org.za>  
**Sent:** 18 June 2001 11:56  
**Subject:** Re: programmer's profile

Deena,

I started as a blind student more than 25 years ago. I'm now a Manager with a lot of contact with students joining us hoping for a career in computing. Unfortunately, I've not had any blind students but I think the disability is irrelevant when looking at the appropriate characteristics.

- Good communication skills, (both verbal and written)
- A strong individual with good team skills. (they will need to be able to ask for, receive and give help willingly)
- Intellectually sound; able to think through and reason arguments explore ideas and recognise when ideas and theories have run their course.
- Attention to detail
- The ability to demonstrate logical and lateral thought processes
- Flexibility, willing to embrace and handle change
- Keen to learn and expand own knowledge
- Self starter, motivated to make ones own progress.
- Commitment and enthusiasm.

Out of the 20 plus trainees I have dealt with over the last 20 years two have failed to help two achieve their goal,

The first put everything into what he was doing, but didn't have the intellectual capacity to be good at it. (He is now a team leader on one of our technical help desks)

The second, had no self belief. He would present good arguments, and write lots of good notes, but he was always reluctant to start and programming (he never had enough information). We are trying him under another manager, but after 8 months the signs aren't good.

The only blind person I have interviewed spent the whole time tilling me why a blind person wouldn't be able to do various things, (most of which I already did), He was rejected, not because he was blind, but because of an excessively negative attitude.

Hope this helps, if you would like some more specific detail, please come back to me.

Granville Gray ext 2153  
+44 (0) 1793 502153



## **BYLAAG P**

### **BESTAANDE MEETINSTRUMENTE**



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YUNIBESITHI YA PRETORIA

CAT 99/1

# HSRC Test Catalogue



*Psychological and  
Proficiency Tests*

## 1999/2000



HUMAN SCIENCES RESEARCH COUNCIL



## PAB (A/137)

### Programmer Aptitude Battery (1987)

#### Description

The Programmer Aptitude Battery\* (PAB) consists of three tests, namely Procedures; Matrices Test I and Matrices Test II.

The battery measures aptitude for computer programming. It is intended to be used on individuals who have little or no experience in computer programming although it might be useful in selecting existing programmers. The battery should not be used on persons who have not passed Grade 12. An exception can be made in the case of individuals who are still in their Grade 12 year.

The PAB imposes similar demands to those imposed by computer programming. However, *superficially* the items are not similar to computer programming, as this would unfairly favour those testees who have had some exposure to programming. Each test in the Battery is described in more detail hereafter.

#### Procedures test

The major task demands of the Procedures Test are: Logical Reasoning, particularly of the propositional (if-then) type; Number Ability (at a fairly elementary level); Precise, methodical approach to problems; Perseverance; Short- and medium-term memory and Reading Comprehension. Testing time: 1 hour

#### Matrices Test I

Matrices Test I measures the individual's speed and accuracy in doing a task which imposes moderately high reasoning demands. It is also intended to prepare the testee for Matrices Test II. Testing time: 10 minutes

#### Matrices Test II

Matrices Test II is the most cognitively demanding test in the battery. In this test the individual has to form hypotheses and carefully check their correctness. Testing time: 10 minutes

#### Important information

- ♦ Classification: Psychological B
- ♦ Type of test: Aptitude
- ♦ Testing time: 2 hours



## CRT (A/138)

# Conceptual Reasoning Test

## Description

The Conceptual Reasoning Test is a non-verbal test of inductive reasoning ability. Inductive reasoning is the ability to detect order in patterns and use these to infer structures or rules. The items consist of four types of problems viz series, two-way classification, transformation and operations.

During the construction of this test, attempts were made to reduce the effects of differences in quality of education and socio-economic background on the test scores. However, testees who have received good schooling and many learning opportunities in life will be at an advantage. Item bias analyses were performed and bias did not emerge. This test can thus be considered for use in cross-cultural situations.

The test should be useful for persons with 12 or more years of formal education, but can also be used for persons currently completing Grade 12.

## Norms

Norms are available for various occupations and languages.

### Important information.

- ♦ Classification: Psychological B
- ♦ Type of test: Conceptual Reasoning
- ♦ Testing time: 35 minutes



## DRT (B/112)

### Deductive Reasoning Test

#### Description

This test is based on formal syllogisms. Each syllogism contains either factual, counter-factual or nonsense premises. The test provides a measure of the ability to deduce logically correct conclusions from the information stated in the premises.

The Deductive Reasoning Test was developed to be used as a selection instrument for scientific, entrepreneurial and other high level professional people.

The test may be used for matriculants and higher qualified testees.

#### **Important information**

- ♦ Classification: Psychological B
- ♦ Testing time: 40 minutes



## Blox Test

### Description

The Blox Test provides a measurement of spatial relations. It measures the ability to visualise three-dimensional drawings and to comprehend the nature of the arrangements of elements within visual stimulus patterns. The testee must analyse given geometric figures and then find them among a group of figures as seen from another angle.

The Blox Test caters especially for conditions where assessment of candidates for technical and mechanical jobs or courses are required. The test is suitable for testees with 10-12 years of formal schooling.

### Norms

Norms are available for various occupational and language groups. Analyses thus far do not indicate item bias.

#### Important information.

- ♦ Classification: Psychological B
- ♦ Type of test: Spatial Orientation
- ♦ Testing time: ± 30 minutes

## FCT (A/121)

# Figure Classification Test

## Description

The FCT is a non-verbal test of reasoning ability. The testee is required to analyse sets of figures and deduce the basic relationships, which divide the drawings into two groups. Uniformity, symmetry, inversion, repetition and series indicate the relationships.

The test is suitable for persons with 7 to 9 years of formal schooling. For persons with 10-12 years of schooling the higher level version can be considered.

## Norms

Norms are available for various occupations and languages.

### Important information

- Classification: Psychological B
- Type of test: Non-verbal reasoning
- Testing time: 1 hour



## HL-FCT (A/129)

### High Level Figure Classification Test

#### Description

This test is a non-verbal test of reasoning ability. Sets of figures are presented to the testee who is required to divide each set into two groups on the basis of similarity.

A wide range of concepts is covered, including direction of rotation, intersection, analogies and series. Bias studies that have been conducted on this test indicate that it can be considered for cross-cultural use.

The test is suitable for persons with 10 to 12 years of formal schooling.

#### Norms

Norms are available for various occupational and language groups.

#### Important information

- Classification: Psychological B
- Testing time: 30 minutes

## RAFT (A/136)

### Rotate and Flip Test (1988)

#### Description

The Rotate and Flip Test was designed to measure one of the main factors in the spatial domain, namely the visualization factor. The RAFT should be useful in predicting success in activities involving the manipulation of objects in space and in imagining what the end orientation will look like. In this regard it can complement the Blox Test which measures perception of spatial relation.

The test consists of 24 items. The items, together with the instructions, are presented in a re-usable booklet. One poster is required for demonstration purposes. The poster has attached to it two shapes which are used to demonstrate the concepts of rotate and flip. Testees record their responses on a separate answer sheet.

The Rotate and Flip Test may be administered to persons with at least ten years of education but is more suitable for persons who have passed Grade 12.

#### Important information

- Classification: Psychological B
- Testing time: 25 minutes

## Senior Aptitude Tests (1978)

### Description

The aim of the SAT is to measure a number of aptitudes of Grades 10, 11 and 12 pupils, as well as for adults. The results can also be used for guidance and selection purposes. A fairly reliable estimated IQ for persons in the age group 14 to 18 years can also be obtained through the SAT scores.

The SAT consists of 12 tests, namely: Verbal Comprehension, Calculations, Disguised Words, Comparison, Pattern Completion, Figure Series, Memory (Paragraph), Spatial 2 D, Spatial 3 D, Memory (Symbols), Co-ordination and Writing Speed. Provision has been made for a profile sheet on which a testee's test and aptitude profile can be graphically represented.

The aim of the different tests is to measure a testee's verbal reasoning, non-verbal reasoning, perceptual speed, number ability, two-dimensional and three-dimensional spatial visualization ability, memory and motor skills.

### Norms

Stanines and percentile ranks are provided for White pupils in Grades 10, 11 and 12 from the erstwhile provincial education departments as well as for first year student teachers.

#### Important information

- Classification: Psychological B
- Type of test: Aptitude
- Testing time: 2 hours



## Junior Aptitude Tests (1974)

### Description

The aim of the JAT is to measure certain aptitudes with a view to using the results together with other results and data with respect to pupils, as an aid in guidance in Grades 7, 8, 9 and 10. The JAT also provides the estimated IQ of a pupil.

The JAT consists of ten tests, namely: Classification; Reasoning; Number Ability; Synonyms; Comparison; Spatial (2 D); Spatial (3 D); Memory (Paragraph); Memory (Words and Symbols) and Mechanical Insight.

The aim of the various tests is to provide a measure of a testee's non-verbal reasoning, verbal reasoning, number ability, perceptual speed, spatial visualization ability, memory and mechanical insight.

### Norms

Stanines are provided for standard groups separately for White pupils from the erstwhile provincial education departments.

#### Important information

- ♦ Classification: Psychological B
- ♦ Type of test: Aptitude
- ♦ Testing time: 3¾ hours

# NEW

## The Differential Aptitude Tests (2000) (Forms R,S,K and L)

The Differential Aptitude Tests are a series of differential aptitude tests constructed to assess some facets of intellectual functioning. Included among these are the following: abstract reasoning ability, language ability, processing speed, mechanical insight etc. The kind of information obtained from the differential aptitude tests can, along with information on interests and previous experience and achievements, facilitate judgements regarding potential success in a course or career. The particular contribution made by a differential aptitude test in vocational and educational counseling is unique and cannot effectively be replaced by measures of achievement, performance or interest. Past, present and future intellectual functioning is influenced by contextual variables and it is the task of the psychologist to interpret the profile of aptitudes accountably.

Differential aptitude tests are available for the General Education and Training phase (GET) and for the Further Education and Training phase (FET). Two forms of the differential aptitude tests will become available for each of the levels of formal education. Standard forms will be more suitable for general use, while the advanced forms can be used when strong academically oriented questions are at issue. The reference group for the standard forms is the whole school going population in the relevant grade, whereas the reference group for the advanced forms, are those persons who had enjoyed relatively good educational opportunities. The tests may also be used with persons who left school some time ago.

### The full series comprises the following:

- Differential Aptitude Tests Form R – (Grades 7 to 10 Standard Form/Available: Aug. 2000)
  - Differential Aptitude Tests Form S – (Grades 7 to 10 Advanced Form/Available: Aug. 2000)
  - Differential Aptitude Tests Form K – (Grades 10 to 12 Standard Form/Available: Aug. 2000)
  - Differential Aptitude Tests Form L – (Grades 10 to 12 Advanced Form/Available: Oct. 1999)
- (The latter was released in 1999 as the Senior Aptitude Tests Form L)

### Tests and testing times for the DAT Form R

Test 1:	English or Afrikaans	20 minutes
Test 2:	Non-verbal Reasoning	23 minutes
Test 3:	Mathematics	42 minutes
Break		20 minutes
Test 4:	Verbal Reasoning	24 minutes
Test 5:	Comparison	9 minutes
Test 6:	Calculations	8 minutes
Break		20 minutes
Test 7:	Spatial Perception: (2-D)	20 minutes
Test 8:	Mechanical Insight	23 minutes
Total testing time (Excluding breaks)		169 minutes

### Tests and testing times for the DAT Forms S and K

Test 1:	Vocabulary	20 minutes
Test 2:	Verbal Reasoning	25 minutes
Break		20 minutes
Test 3:	Non-Verbal Reasoning: Figures	25 minutes
Test 4:	Computations	28 minutes
Test 5:	Reading Comprehension	33 minutes
Test 6:	Comparison	4 minutes
Break		20 minutes
Test 9:	Memory (Paragraph) – Learning time	6 minutes
Test 7:	Spatial Visualization 3 D	25 minutes



Test 8: Mechanical Insight	28 minutes
Test 9: Memory (Paragraph)	10 minutes
Total testing time (Excluding breaks)	204 minutes

**Tests and testing times for the DAT Form L**

Test 1: Vocabulary	10 minutes
Test 2: Verbal Reasoning	15 minutes
Test 3: Non-verbal Reasoning; Figures	11 minutes
Break	5 minutes
Test 4: Calculations	20 minutes
Test 5: Reading Comprehension	15 minutes
Test 6: Comparison	8 minutes
Test 7: Price Controlling	8 minutes
Break	20 minutes
Test 10: Memory – Learning time	6 minutes
Test 8: Spatial Visualization 3-D	12 minutes
Test 9: Mechanical Insight	18 minutes
Test 10: Memory	8 minutes
Total testing time (excluding breaks)	131 minutes



## **BYLAAG 1**

### **ITEMONTLEDING VAN DIE RSAT**

## BYLAAG 1: ITEMONTLEDING VAN DIE RSAT

Tabel A1.1 Itemontleding van Toets 1: Verbale Tegnieuse Redenering

Items van Toets	Aantal probeer	Aantal korrek	Item afleier statistiek					Korrekte afleier
			Afleier 1	Afleier 2	Afleier 3	Afleier 4	Afleier 5	
Item 01	463	425	0.4%	6.5%	91.8%	0.4%	0.9%	3
Item 02	462	354	11.3%	0.9%	76.6%	5.2%	6.1%	3
Item 03	462	225	2.6%	24.9%	48.7%	18.0%	5.8%	3
Item 04	463	395	2.4%	1.9%	6.7%	85.3%	3.7%	4
Item 05	462	285	61.7%	2.2%	7.6%	23.6%	5.0%	1
Item 06	461	183	13.2%	9.3%	39.7%	5.2%	32.5%	3
Item 07	463	252	54.4%	8.9%	18.8%	9.1%	8.9%	1
Item 08	461	279	11.9%	60.5%	24.3%	2.2%	1.1%	2
Item 09	460	283	31.3%	3.5%	2.0%	61.5%	1.7%	4
Item 10	453	184	39.5%	40.6%	6.0%	12.8%	1.1%	2
Item 11	442	337	7.9%	2.9%	76.2%	3.4%	9.5%	3
Item 12	430	244	13.5%	8.4%	56.7%	16.0%	5.3%	3
Item 13	424	202	7.8%	7.8%	47.6%	8.0%	28.8%	3
Item 14	408	313	76.7%	6.9%	5.9%	3.9%	6.6%	1
Item 15	381	233	12.1%	61.2%	6.8%	10.2%	9.7%	2
Item 16	355	227	15.2%	63.9%	13.2%	4.2%	3.4%	2
Item 17	329	203	8.2%	14.9%	7.3%	61.7%	7.9%	4
Item 18	301	151	13.6%	50.2%	17.9%	9.6%	8.6%	2
Item 19	269	149	8.6%	10.0%	17.8%	55.4%	8.2%	4
Item 20	254	164	64.6%	8.7%	11.8%	4.3%	10.6%	1

**Tabel A1.2 Itemontleding van Toets 2: Syferreekse**

Items van Toets 2	Aantal probeer	Aantal korrek	Item afleier statistiek					Korrekte afleier
			Afleier 1	Afleier 2	Afleier 3	Afleier 4	Afleier 5	
Item 01	462	419	90.7%	2.8%	1.7%	0.6%	4.1%	1
Item 02	462	424	0.6%	91.8%	5.6%		1.9%	2
Item 03	462	231	19.5%	0.9%	50.0%	18.0%	11.7%	3
Item 04	456	160	7.7%	53.1%	2.4%	1.8%	35.1%	5
Item 05	457	208	46.8%	3.7%	2.6%	45.5%	1.3%	4
Item 06	456	350	76.8%	10.7%	5.7%	3.1%	3.7%	1
Item 07	445	243	19.3%	14.8%	1.6%	9.7%	54.6%	5
Item 08	440	253	5.2%	57.5%	22.5%	6.1%	8.6%	2
Item 09	427	237	7.7%	10.3%	55.5%	5.6%	20.8%	3
Item 10	431	289	2.8%	24.4%	5.1%	0.7%	67.1%	5
Item 11	424	365	3.5%	3.1%	86.1%	2.4%	5.0%	3
Item 12	401	305	5.0%	10.0%	4.5%	4.5%	76.1%	5
Item 13	393	322	4.1%	3.1%	5.3%	81.9%	5.6%	4
Item 14	387	312	4.1%	4.7%	80.6%	4.9%	5.7%	3
Item 15	347	176	3.5%	15.9%	26.2%	3.7%	50.7%	5
Item 16	326	214	12.0%	6.1%	4.0%	12.3%	65.6%	5
Item 17	319	222	9.1%	5.3%	3.8%	12.2%	69.6%	5
Item 18	307	222	72.3%	19.5%	3.9%	2.0%	2.3%	1
Item 19	299	219	2.3%	73.2%	19.1%	2.0%	3.3%	2
Item 20	292	209	19.2%	1.4%	71.6%	3.8%	4.1%	3

**Tabel A1.3 Itemontleding van Toets 3: Karaktervergelyking**

Items van Toets 3	Aantal probeer	Aantal korrek	Item afleier statistiek					Korrekte afleier
			Afleier 1	Afleier 2	Afleier 3	Afleier 4	Afleier 5	
Item 01	462	446	1.9%	0.6%	0.6%	0.2%	96.5%	5
Item 02	463	446	0.6%	96.3%	1.9%	0.6%	0.4%	2
Item 03	463	415	89.6%	0.4%	7.8%	1.7%	0.4%	1
Item 04	463	410	1.1%	0.4%	0.4%	9.5%	88.6%	5
Item 05	463	443	0.6%	1.1%	1.5%	95.7%	1.1%	4
Item 06	462	443	1.7%	0.2%	95.9%	1.7%	0.4%	3
Item 07	462	437	94.6%	2.6%	2.2%		0.6%	1
Item 08	462	430	1.3%	2.8%	93.1%	1.7%	1.1%	3
Item 09	459	440	0.9%	95.9%	1.3%	0.7%	1.3%	2
Item 10	459	409		0.7%	10.0%	0.2%	89.1%	5
Item 11	454	423	2.4%	1.8%	93.2%	1.1%	1.5%	3
Item 12	452	440	0.2%	1.3%	0.9%	0.2%	97.3%	5
Item 13	446	422	0.4%	94.6%	1.3%	1.3%	2.2%	2
Item 14	432	360	0.5%	2.5%	3.0%	10.6%	83.3%	5
Item 15	422	393	1.2%	93.1%	0.5%	1.7%	3.6%	2
Item 16	406	278	1.7%	2.0%	6.2%	21.7%	68.5%	5
Item 17	381	340	89.2%	3.1%	2.9%	1.8%	2.9%	1
Item 18	352	335	1.1%	95.2%	0.9%	1.1%	1.7%	2
Item 19	337	302	89.6%	1.8%	3.6%	1.5%	3.6%	1
Item 20	325	299	3.4%	1.8%	92.0%	1.8%	0.9%	3

**Tabel A1.4 Itemontleding van Toets 4: Sintaksvergeelyking**

Items van Toets 4	Aantal probeer	Aantal korrek	Item afleier statistiek					Korrekte afleier
			Afleier 1	Afleier 2	Afleier 3	Afleier 4	Afleier 5	
Item 01	463	418	1.7%	3.0%	90.3%	1.5%	3.5%	3
Item 02	462	275	6.9%	4.1%	1.9%	59.5%	27.5%	4
Item 03	459	357	77.8%	10.5%	1.5%	2.0%	8.3%	1
Item 04	460	312	2.2%	2.0%	5.4%	67.8%	22.6%	4
Item 05	458	319	2.6%	4.1%	69.7%	3.5%	20.1%	3
Item 06	456	399	2.0%	87.5%	3.5%	2.9%	4.2%	2
Item 07	454	361	1.1%	11.2%	79.5%	2.9%	5.3%	3
Item 08	447	295	14.5%	66.0%	4.3%	4.7%	10.5%	2
Item 09	444	315	1.6%	2.7%	0.9%	70.9%	23.9%	4
Item 10	441	244	9.3%	1.8%	22.9%	10.7%	55.3%	5
Item 11	418	291	11.2%	15.1%	2.4%	1.7%	69.6%	5
Item 12	415	290	69.9%	6.3%	8.4%	2.4%	13.0%	1
Item 13	399	141	11.3%	3.5%	5.8%	35.3%	44.1%	4
Item 14	383	291	10.2%	3.7%	76.0%	5.5%	4.7%	3
Item 15	360	179	8.1%	6.4%	3.1%	49.7%	32.8%	4
Item 16	347	267	10.1%	76.9%	3.2%	2.3%	7.5%	2
Item 17	331	271	1.5%	3.9%	81.9%	5.7%	6.9%	3
Item 18	313	249	6.1%	79.6%	5.1%	2.6%	6.7%	2
Item 19	285	190	3.5%	2.1%	2.8%	66.7%	24.9%	4
Item 20	279	200	3.9%	4.7%	15.4%	4.3%	71.7%	5

**Tabel A1.5 Itemontleding van Toets 5: Patroonmatriks**

Items van Toets 5	Aantal probeer	Aantal korrek	Item afleier statistiek					Korrekte afleier
			Afleier 1	Afleier 2	Afleier 3	Afleier 4	Afleier 5	
Item 01	463	402	4.5%	86.8%	4.5%	1.5%	2.6%	2
Item 02	463	411	88.8%	3.0%	3.9%	1.9%	2.4%	1
Item 03	461	398	2.0%	2.8%	4.1%	4.8%	86.3%	5
Item 04	461	308	20.2%	66.8%	2.2%	2.0%	8.9%	2
Item 05	461	349	2.2%	11.1%	2.8%	8.2%	75.7%	5
Item 06	460	377	82.0%	4.1%	8.3%	3.9%	1.7%	1
Item 07	457	405	5.5%	88.6%	2.8%	2.0%	1.1%	2
Item 08	457	404	2.6%	4.6%	88.4%	0.7%	3.7%	3
Item 09	456	294	2.4%	13.6%	64.5%	13.8%	5.7%	3
Item 10	455	286	4.4%	16.7%	9.7%	62.9%	6.4%	4
Item 11	452	247	11.5%	54.6%	7.3%	10.6%	15.9%	2
Item 12	451	271	60.1%	10.2%	18.6%	4.7%	6.4%	1
Item 13	440	310	2.7%	5.5%	70.5%	8.0%	13.4%	3
Item 14	437	245	15.3%	7.3%	10.5%	56.1%	10.8%	4
Item 15	423	299	4.7%	3.8%	6.4%	14.4%	70.7%	5
Item 16	410	315	5.1%	14.1%	2.9%	1.0%	76.8%	5
Item 17	397	267	1.8%	67.3%	9.6%	12.6%	8.8%	2
Item 18	375	254	9.9%	12.0%	67.7%	4.5%	5.9%	3
Item 19	350	216	4.9%	61.7%	8.0%	21.1%	4.3%	2
Item 20	335	192	17.3%	57.3%	3.3%	19.1%	3.0%	2

**Tabel A1.6 Itemontleding van Toets 6: Vloedigramme**

Items van Tabel 6	Aantal probeer	Aantal korrek	Item afleier statistiek					Korrekte afleier
			Afleier 1	Afleier 2	Afleier 3	Afleier 4	Afleier 5	
Item 01	462	423	1.3%	0.4%	5.2%	91.6%	1.5%	4
Item 02	462	383	1.3%	9.3%	4.1%	82.9%	2.4%	4
Item 03	461	402	2.2%	2.4%	87.2%	5.6%	2.6%	3
Item 04	457	158	33.3%	9.4%	11.6%	11.2%	34.6%	5
Item 05	460	402	2.0%	3.5%	87.4%	2.4%	4.8%	3
Item 06	455	366	4.6%	80.4%	7.5%	3.1%	4.4%	2
Item 07	455	361	7.3%	79.3%	9.0%	2.0%	2.4%	2
Item 08	451	334	74.1%	9.3%	6.4%	6.4%	3.8%	1
Item 09	448	387	4.5%	2.0%	86.4%	2.9%	4.2%	3
Item 10	431	215	27.4%	49.9%	8.6%	4.6%	9.5%	2
Item 11	420	200	23.1%	5.2%	13.1%	11.0%	47.6%	5
Item 12	421	249	11.2%	5.7%	15.9%	59.1%	8.1%	4
Item 13	414	358	1.4%	5.6%	3.9%	86.5%	2.7%	4
Item 14	410	161	6.1%	9.8%	32.7%	12.2%	39.3%	5
Item 15	397	267	7.1%	5.5%	13.1%	7.1%	67.3%	5
Item 16	389	306	5.7%	5.9%	6.4%	3.3%	78.7%	5
Item 17	373	131	2.4%	54.2%	3.2%	5.1%	35.1%	5
Item 18	355	183	11.8%	5.1%	26.8%	4.8%	51.5%	5
Item 19	349	307	1.1%	4.9%	3.7%	88.0%	2.3%	4
Item 20	341	294	4.4%	86.2%	3.2%	3.5%	2.6%	2

**Tabel A1.7 Itemontleding van Toets 7: Dimensionele Redenering**

Items van Toets 7	Aantal probeer	Aantal korrek	Item afleier statistiek					Korrekte afleier
			Afleier 1	Afleier 2	Afleier 3	Afleier 4	Afleier 5	
Item 01	463	457	0.4%	0.4%	98.7%		0.4%	3
Item 02	462	175	13.4%	31.8%	0.4%	16.5%	37.9%	5
Item 03	463	428	92.4%	0.9%	5.2%	0.6%	0.9%	1
Item 04	463	420	7.6%	90.7%	0.4%	0.4%	0.9%	2
Item 05	463	370	79.9%	6.0%	6.0%	0.6%	7.3%	1
Item 06	463	310	0.9%	25.1%	4.8%	67.0%	2.4%	4
Item 07	463	336	3.5%	72.6%	9.7%	3.2%	11.0%	2
Item 08	463	389	7.1%	1.3%	84.0%	0.4%	7.1%	3
Item 09	463	135	5.0%	32.6%	1.5%	31.7%	29.2%	5
Item 10	463	197	49.0%	3.5%	42.5%	2.8%	2.2%	3
Item 11	461	335	0.9%	22.3%	1.1%	72.7%	3.0%	4
Item 12	461	397	2.6%	86.1%	0.2%	9.5%	1.5%	2
Item 13	461	343	74.4%	15.2%	3.5%	0.9%	6.1%	1
Item 14	462	349	75.5%	1.9%	2.6%	5.8%	14.1%	1
Item 15	459	317	11.3%	14.8%	2.4%	2.4%	69.1%	5
Item 16	454	244	7.7%	53.7%	8.8%	5.3%	24.4%	2
Item 17	452	390	3.3%	3.1%	3.3%	86.3%	4.0%	4
Item 18	449	161	28.3%	12.0%	35.9%	13.6%	10.2%	3
Item 19	446	265	0.4%	4.5%	59.4%	32.5%	3.1%	3
Item 20	442	358	81.0%	2.3%	4.8%	3.2%	8.8%	1



## **BYLAAG 2**

### **ITEMSTATISTIEK VAN DIE RSAT (PER SKOOLGROEP)**

## BYLAAG 2: ITEMSTATISTIEK VAN DIE RSAT PER SKOOLGROEP

**Tabel B1.1** Itemstatistiek per skoolgroep op Toets 1: Verbale Tegnieuse Redenering

	1 Laudium		2 Waterkloof (graad 9)		3 Nylstroom		4 Oos-Moot		5 Waterkloof (graad 10)		6 Waterkloof (graad 11)		7 Wonderboom		8 Voortrekkers- hoogte	
	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek
T1V01	48	45.00	57	54.00	55	53.00	53	53.00	85	77.00	67	60.00	51	47.00	47	36.00
T1V02	48	27.00	57	48.00	54	35.00	53	46.00	85	72.00	67	56.00	51	39.00	47	31.00
T1V03	48	22.00	57	30.00	54	33.00	53	26.00	85	38.00	67	31.00	51	28.00	47	17.00
T1V04	48	38.00	57	48.00	55	45.00	53	49.00	85	78.00	67	56.00	51	46.00	47	35.00
T1V05	48	28.00	57	42.00	55	39.00	53	25.00	85	57.00	67	42.00	51	39.00	46	13.00
T1V06	48	14.00	57	30.00	54	15.00	53	25.00	85	39.00	67	30.00	51	15.00	46	15.00
T1V07	48	31.00	57	32.00	55	32.00	53	23.00	85	42.00	67	29.00	51	37.00	47	26.00
T1V08	47	21.00	56	34.00	55	37.00	53	30.00	85	52.00	67	45.00	51	33.00	47	27.00
T1V09	46	20.00	57	34.00	55	31.00	53	44.00	85	68.00	67	45.00	51	23.00	46	18.00
T1V10	43	16.00	57	23.00	52	17.00	53	23.00	85	37.00	67	35.00	51	18.00	45	15.00
T1V11	40	24.00	57	46.00	48	35.00	53	48.00	84	70.00	67	48.00	51	41.00	42	25.00
T1V12	36	11.00	57	34.00	43	24.00	53	36.00	84	59.00	67	41.00	49	27.00	41	12.00
T1V13	34	12.00	57	32.00	43	19.00	53	25.00	84	42.00	64	37.00	49	21.00	40	14.00
T1V14	31	17.00	55	44.00	37	28.00	53	44.00	84	73.00	62	45.00	49	42.00	37	20.00
T1V15	25	9.00	54	29.00	32	19.00	52	33.00	80	61.00	57	38.00	47	30.00	34	14.00
T1V16	22	10.00	53	43.00	24	17.00	50	34.00	72	48.00	54	31.00	48	31.00	32	13.00
T1V17	22	4.00	52	33.00	20	7.00	49	36.00	65	46.00	48	33.00	46	36.00	27	8.00
T1V18	21	4.00	50	35.00	19	3.00	46	26.00	62	29.00	42	24.00	36	20.00	25	10.00
T1V19	19	11.00	47	31.00	12	6.00	44	27.00	56	24.00	36	20.00	31	20.00	24	10.00
T1V20	19	15.00	41	29.00	11	7.00	43	26.00	55	32.00	32	20.00	29	25.00	24	10.00

**Tabel B1.2 Itemstatistiek per skoolgroep op Toets 2: Syfferreekse**

	1 Laudium		2 Waterkloof (graad 9)		3 Nyistroom		4 Oos-Moof		5 Waterkloof (graad 10)		6 Waterkloof (graad 11)		7 Wonderboom		8 Voortrekker-hoogte	
	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek
T2V01	48	36.00	57	54.00	55	51.00	53	50.00	85	81.00	67	65.00	51	44.00	46	38.00
T2V02	48	38.00	57	53.00	55	50.00	53	51.00	85	77.00	67	63.00	51	49.00	46	43.00
T2V03	48	15.00	57	37.00	55	23.00	53	30.00	85	49.00	67	39.00	51	21.00	46	17.00
T2V04	45	10.00	57	21.00	55	26.00	52	23.00	85	26.00	67	30.00	51	13.00	44	11.00
T2V05	45	20.00	57	30.00	55	23.00	53	31.00	85	45.00	67	27.00	51	18.00	44	14.00
T2V06	45	24.00	57	49.00	55	40.00	53	45.00	85	68.00	67	58.00	50	40.00	44	26.00
T2V07	40	22.00	57	36.00	54	23.00	53	37.00	84	43.00	65	40.00	49	24.00	43	18.00
T2V08	37	14.00	57	38.00	53	24.00	53	39.00	85	56.00	67	39.00	50	28.00	38	15.00
T2V09	32	13.00	57	36.00	51	30.00	51	27.00	85	55.00	65	38.00	49	24.00	37	14.00
T2V10	32	15.00	57	45.00	50	30.00	53	43.00	85	62.00	67	51.00	49	25.00	38	18.00
T2V11	28	17.00	57	52.00	48	42.00	53	46.00	85	82.00	66	59.00	48	41.00	39	26.00
T2V12	25	15.00	55	42.00	43	36.00	52	44.00	83	57.00	63	52.00	44	38.00	36	21.00
T2V13	21	13.00	56	47.00	41	30.00	53	51.00	82	68.00	63	55.00	43	37.00	34	21.00
T2V14	20	13.00	55	47.00	40	30.00	53	49.00	82	64.00	63	51.00	42	37.00	32	21.00
T2V15	15	9.00	53	31.00	35	17.00	51	27.00	74	35.00	58	29.00	33	16.00	28	12.00
T2V16	15	10.00	52	39.00	26	18.00	48	36.00	74	43.00	56	36.00	30	23.00	25	9.00
T2V17	15	10.00	51	39.00	25	19.00	48	37.00	72	43.00	55	41.00	29	22.00	24	11.00
T2V18	16	13.00	51	44.00	24	20.00	48	40.00	69	44.00	51	32.00	26	18.00	22	11.00
T2V19	15	11.00	50	43.00	20	15.00	48	42.00	70	43.00	48	33.00	26	19.00	22	13.00
T2V20	14	13.00	50	44.00	18	13.00	48	41.00	70	43.00	46	31.00	25	16.00	21	8.00

**Tabel B1.3 Itemstatistiek per skoolgroep op Toets 3: Karaktervergeelyking**

	1 Laudium		2 Waterkloof (graad 9)		3 Nylstroom		4 Oos-Moot		5 Waterkloof (graad 10)		6 Waterkloof (graad 11)		7 Wonderboom		8 Voortrekkerhoogte	
	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek
T3V01	48	47.00	57	57.00	54	53.00	53	52.00	85	82.00	67	62.00	51	50.00	47	43.00
T3V02	48	47.00	57	53.00	55	54.00	53	51.00	85	84.00	67	65.00	51	50.00	47	42.00
T3V03	48	46.00	57	52.00	55	50.00	53	49.00	85	78.00	67	58.00	51	43.00	47	39.00
T3V04	48	42.00	57	52.00	55	46.00	53	52.00	85	77.00	67	60.00	51	47.00	47	34.00
T3V05	48	46.00	57	56.00	55	50.00	53	51.00	85	82.00	67	65.00	51	50.00	47	43.00
T3V06	48	47.00	57	54.00	55	52.00	53	51.00	85	82.00	67	66.00	51	49.00	46	42.00
T3V07	48	47.00	57	55.00	55	51.00	53	52.00	85	81.00	67	64.00	51	46.00	46	41.00
T3V08	48	46.00	57	55.00	55	48.00	53	52.00	85	78.00	67	64.00	51	48.00	46	39.00
T3V09	48	45.00	56	54.00	54	49.00	53	52.00	85	84.00	67	66.00	51	50.00	45	40.00
T3V10	48	40.00	56	54.00	54	47.00	53	47.00	85	70.00	67	62.00	51	49.00	45	40.00
T3V11	48	37.00	56	56.00	53	48.00	53	49.00	84	82.00	67	66.00	51	48.00	42	37.00
T3V12	48	46.00	56	55.00	52	49.00	53	50.00	83	83.00	67	67.00	51	51.00	42	39.00
T3V13	45	39.00	56	55.00	51	46.00	52	48.00	83	81.00	67	66.00	51	51.00	41	36.00
T3V14	42	30.00	56	53.00	48	37.00	51	41.00	82	76.00	66	56.00	50	46.00	37	21.00
T3V15	40	34.00	55	53.00	47	44.00	50	45.00	81	79.00	65	61.00	48	46.00	36	31.00
T3V16	39	27.00	53	37.00	44	26.00	45	30.00	81	61.00	64	42.00	45	36.00	35	19.00
T3V17	37	31.00	51	46.00	38	32.00	41	35.00	79	76.00	63	60.00	43	39.00	29	21.00
T3V18	37	36.00	47	44.00	31	31.00	39	37.00	74	70.00	58	56.00	40	37.00	26	24.00
T3V19	37	28.00	46	38.00	26	24.00	37	34.00	72	69.00	55	50.00	39	37.00	25	22.00
T3V20	35	33.00	44	37.00	21	17.00	37	32.00	71	71.00	54	54.00	37	35.00	26	20.00

**Tabel B1.4 Itemstatistiek per skoolgroep op Toets 4: Sintaksvergekyking**

	1 Laudium		2 Waterkloof (graad 9)		3 Nylstroom		4 Oos-Moot		5 Waterkloof (graad 10)		6 Waterkloof (graad 11)		7 Wonderboom		8 Voortrekker hoogte	
	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek
T4V01	48	37.00	57	54.00	55	47.00	53	53.00	85	81.00	67	65.00	51	45.00	47	36.00
T4V02	48	27.00	57	40.00	55	23.00	53	35.00	85	62.00	67	38.00	51	27.00	46	23.00
T4V03	47	31.00	57	47.00	54	36.00	53	40.00	85	70.00	66	56.00	51	45.00	46	32.00
T4V04	47	26.00	57	47.00	54	34.00	53	33.00	85	68.00	67	45.00	51	36.00	46	23.00
T4V05	46	6.00	57	51.00	55	47.00	53	18.00	85	76.00	66	58.00	51	46.00	45	17.00
T4V06	43	33.00	57	53.00	55	49.00	53	47.00	85	79.00	67	62.00	51	45.00	45	31.00
T4V07	43	22.00	57	50.00	55	45.00	52	37.00	85	79.00	67	59.00	51	43.00	44	26.00
T4V08	39	15.00	57	40.00	54	40.00	52	38.00	84	57.00	67	47.00	51	36.00	43	22.00
T4V09	36	21.00	57	45.00	55	44.00	52	36.00	84	65.00	66	47.00	51	35.00	43	22.00
T4V10	34	16.00	57	38.00	54	28.00	52	31.00	84	41.00	67	38.00	50	34.00	43	18.00
T4V11	28	21.00	57	47.00	52	28.00	51	39.00	82	58.00	66	48.00	47	32.00	35	18.00
T4V12	27	14.00	56	41.00	52	33.00	50	31.00	84	72.00	66	44.00	47	37.00	33	18.00
T4V13	24	11.00	54	17.00	51	16.00	47	9.00	84	33.00	66	25.00	46	22.00	27	8.00
T4V14	19	2.00	53	47.00	47	37.00	46	28.00	82	71.00	65	57.00	44	38.00	27	11.00
T4V15	19	9.00	51	27.00	39	13.00	42	7.00	79	52.00	64	38.00	41	25.00	25	8.00
T4V16	17	8.00	52	47.00	37	27.00	40	33.00	75	58.00	64	48.00	38	30.00	24	16.00
T4V17	17	11.00	51	45.00	32	28.00	39	31.00	69	56.00	63	55.00	37	28.00	23	17.00
T4V18	17	10.00	50	41.00	31	23.00	38	29.00	65	52.00	57	52.00	31	26.00	24	16.00
T4V19	15	6.00	50	33.00	24	14.00	34	18.00	62	48.00	51	43.00	28	17.00	21	11.00
T4V20	15	10.00	48	41.00	24	17.00	33	20.00	62	48.00	51	36.00	26	19.00	20	9.00

**Tabel B1.5 Itemstatistiek per skoolgroep op Toets 5: Patroonmatriks**

	1 Laudium		2 Waterkloof (graad 9)		3 Nylstroom		4 Oos-Moet		5 Waterkloof (graad 10)		6 Waterkloof (graad 11)		7 Wonderboom		8 Voortrekker-hoogte	
	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek
T5V01	48	43.00	57	53.00	55	41.00	53	49.00	85	76.00	67	59.00	51	43.00	47	38.00
T5V02	48	38.00	57	55.00	55	44.00	53	49.00	85	80.00	67	62.00	51	45.00	47	38.00
T5V03	46	37.00	57	53.00	55	44.00	53	49.00	85	78.00	67	57.00	51	45.00	47	35.00
T5V04	46	24.00	57	42.00	55	33.00	53	38.00	85	73.00	67	41.00	51	36.00	47	21.00
T5V05	46	29.00	57	51.00	55	41.00	53	42.00	85	72.00	67	50.00	51	41.00	47	23.00
T5V06	46	32.00	57	46.00	54	38.00	53	50.00	85	77.00	67	59.00	51	43.00	47	32.00
T5V07	44	33.00	56	52.00	55	49.00	53	51.00	85	80.00	67	60.00	51	47.00	46	33.00
T5V08	44	30.00	56	54.00	55	46.00	52	46.00	85	79.00	67	62.00	51	49.00	47	38.00
T5V09	42	17.00	56	48.00	55	25.00	53	40.00	85	59.00	67	48.00	51	35.00	47	22.00
T5V10	41	13.00	56	39.00	55	31.00	53	37.00	85	60.00	67	49.00	51	35.00	47	22.00
T5V11	39	21.00	57	36.00	55	24.00	52	29.00	84	55.00	67	39.00	51	26.00	47	17.00
T5V12	38	16.00	57	43.00	55	29.00	53	35.00	84	57.00	66	39.00	51	35.00	47	17.00
T5V13	35	23.00	57	49.00	51	26.00	51	37.00	84	61.00	67	52.00	50	42.00	45	20.00
T5V14	36	15.00	57	44.00	50	15.00	51	31.00	84	54.00	66	46.00	49	26.00	44	14.00
T5V15	32	16.00	56	49.00	50	31.00	50	36.00	84	65.00	63	48.00	49	37.00	39	17.00
T5V16	31	20.00	57	51.00	47	32.00	49	39.00	82	67.00	62	50.00	47	38.00	35	18.00
T5V17	29	14.00	56	43.00	47	23.00	46	36.00	81	61.00	60	42.00	45	31.00	33	17.00
T5V18	28	6.00	56	49.00	43	25.00	40	29.00	80	67.00	59	34.00	42	30.00	27	14.00
T5V19	27	15.00	55	37.00	40	26.00	35	22.00	78	48.00	53	33.00	37	20.00	25	15.00
T5V20	26	4.00	54	35.00	35	13.00	29	14.00	77	55.00	52	37.00	37	24.00	25	10.00

**Tabel B1.6 Itemstatistiek per skoolgroep op Toets 6: Vloeiagramme**

	1 Laudium		2 Waterkloof (graad 9)		3 Nylstroom		4 Oos-Moot		5 Waterkloof (graad 10)		6 Waterkloof (graad 11)		7 Wonderboom		8 Voortrekker-hoogte	
	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek
T6V01	48	44.00	57	55.00	55	51.00	53	48.00	85	77.00	67	67.00	50	47.00	47	34.00
T6V02	48	36.00	56	48.00	55	48.00	53	46.00	85	68.00	67	62.00	51	43.00	47	32.00
T6V03	48	39.00	56	55.00	55	49.00	53	47.00	85	75.00	67	64.00	50	43.00	47	30.00
T6V04	48	9.00	57	18.00	54	15.00	52	23.00	85	33.00	66	28.00	48	18.00	47	14.00
T6V05	47	33.00	57	55.00	55	47.00	53	46.00	85	80.00	67	63.00	49	42.00	47	36.00
T6V06	44	27.00	56	48.00	55	49.00	53	43.00	85	74.00	67	56.00	49	40.00	46	29.00
T6V07	43	27.00	57	49.00	55	42.00	53	41.00	85	72.00	67	58.00	50	43.00	45	29.00
T6V08	42	25.00	57	52.00	53	35.00	53	38.00	85	73.00	67	54.00	50	37.00	44	20.00
T6V09	40	32.00	57	52.00	55	47.00	53	46.00	85	73.00	67	62.00	50	46.00	41	29.00
T6V10	35	20.00	56	29.00	49	21.00	53	23.00	83	42.00	67	41.00	47	23.00	41	16.00
T6V11	33	19.00	53	31.00	46	16.00	53	28.00	83	40.00	66	37.00	46	21.00	40	8.00
T6V12	30	25.00	53	30.00	49	26.00	53	28.00	84	52.00	67	43.00	47	29.00	38	16.00
T6V13	27	19.00	55	49.00	48	42.00	51	45.00	83	75.00	65	60.00	49	40.00	36	28.00
T6V14	27	4.00	55	30.00	47	19.00	51	25.00	82	33.00	64	25.00	48	18.00	36	7.00
T6V15	24	12.00	54	46.00	44	30.00	51	32.00	81	59.00	63	46.00	46	27.00	34	15.00
T6V16	23	14.00	50	49.00	44	29.00	51	42.00	80	69.00	62	55.00	45	31.00	34	17.00
T6V17	20	3.00	45	16.00	40	8.00	50	23.00	78	39.00	60	21.00	46	14.00	34	7.00
T6V18	20	5.00	40	28.00	37	17.00	50	25.00	74	46.00	58	37.00	43	17.00	33	8.00
T6V19	20	18.00	36	33.00	37	34.00	51	42.00	73	67.00	58	53.00	43	39.00	31	21.00
T6V20	20	14.00	36	30.00	34	30.00	50	46.00	73	66.00	56	52.00	42	36.00	30	20.00

**Tabel B1.7 Itemstatistiek per skoolgroep op Toets 7: Dimensionele Redenering**

	1 Laudium		2 Waterkloof (graad 9)		3 Nylstroom		4 Oos-Moot		5 Waterkloof (graad 10)		6 Waterkloof (graad 11)		7 Wonderboom		8 Voortrekker- hoogte	
	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek	Aantal probeer	Aantal korrek
T7V01	48	47.00	57	57.00	55	55.00	53	53.00	85	84.00	67	66.00	51	49.00	47	46.00
T7V02	48	17.00	57	38.00	54	20.00	53	12.00	85	30.00	67	27.00	51	26.00	47	4.00
T7V03	48	37.00	57	55.00	55	51.00	53	51.00	85	81.00	67	64.00	51	50.00	47	39.00
T7V04	48	43.00	57	55.00	55	44.00	53	50.00	85	80.00	67	58.00	51	47.00	47	43.00
T7V05	48	39.00	57	44.00	55	39.00	53	47.00	85	64.00	67	54.00	51	41.00	47	42.00
T7V06	48	15.00	57	39.00	55	32.00	53	45.00	85	66.00	67	47.00	51	39.00	47	27.00
T7V07	48	35.00	57	35.00	55	41.00	53	45.00	85	58.00	67	49.00	51	36.00	47	37.00
T7V08	48	27.00	57	47.00	55	38.00	53	51.00	85	78.00	67	63.00	51	44.00	47	41.00
T7V09	48	8.00	57	30.00	55	12.00	53	21.00	85	30.00	67	17.00	51	14.00	47	3.00
T7V10	48	9.00	57	20.00	55	18.00	53	32.00	85	43.00	67	34.00	51	20.00	47	21.00
T7V11	48	21.00	56	49.00	55	28.00	53	45.00	85	72.00	67	51.00	50	42.00	47	27.00
T7V12	47	35.00	57	56.00	55	42.00	53	49.00	85	78.00	67	60.00	50	47.00	47	30.00
T7V13	47	27.00	57	49.00	55	38.00	53	43.00	85	71.00	67	49.00	50	44.00	47	22.00
T7V14	48	11.00	57	50.00	55	40.00	53	48.00	85	71.00	67	60.00	50	40.00	47	29.00
T7V15	46	20.00	57	52.00	55	33.00	53	49.00	85	60.00	67	47.00	49	34.00	47	22.00
T7V16	45	8.00	55	41.00	54	21.00	53	34.00	85	50.00	67	46.00	48	27.00	47	17.00
T7V17	43	26.00	55	54.00	55	42.00	53	47.00	85	83.00	67	60.00	47	45.00	47	33.00
T7V18	42	13.00	55	34.00	55	11.00	53	25.00	85	35.00	67	22.00	46	14.00	46	7.00
T7V19	42	13.00	55	39.00	54	24.00	53	32.00	84	62.00	67	49.00	45	27.00	46	19.00
T7V20	42	30.00	54	48.00	53	35.00	53	42.00	85	76.00	67	59.00	42	36.00	46	32.00