Bibliography

[1] The Java HotSpot Virtual Machine, v1.4.1, Technical White Paper, 2002. `http://java.sun.com/products/hotspot/`.

[2] OMG Unified Modeling Language, Version 1.5, An Adopted Formal Specification of the Object Management Group, 2003. `http://www.omg.org/cgi-bin/apps/doc?formal/03-03-01.pdf`.

[3] Using Open Source Software in the South African Government, A proposed strategy compiled by the government information technology officers' council, 2003. `http://www.oss.gov.za/docs/OSS_Strategy_v3.pdf`.

[4] D. Alur, D. Malks, and J. Crupi. *Core J2EE Patterns: Best Practices and Design Strategies.* Prentice Hall, 2003.

[5] M. R. Anderberg. *Cluster Analysis for Applications.* Academic Press, 1973.

[6] R. C. Arkin. *Behaviour-Based Robotics (Intelligent Robotics and Autonomous Agents).* Bradford Books, 1998.

[7] S. Arya, D. M. Mount, N. S. Netanyahu, R. Silverman, and A. Y. Wu. An optimal algorithm for approximate nearest neighbor searching fixed dimensions. *Journal of the ACM*, 45(6):891–923, 1998.

[8] M. Ashnault, Z. Dean, T. Garben, P. R. Allen, J. J. Bambara, and S. Smith. *J2EE Unleashed.* Sams, 2001.

[9] R. Ausbrooks, S. Buswell, D. Carlisle, S. Dalmas, S. Devitt, A. Diaz, M. Froumentin, R. Huner, P. Ion, M. Kholhase, R. Miner, N. Poppelier, B. Smith, N. Soiffer, R. Sutor, and S. Watt. Mathematical

Markup Language (MathML) Version 2.0, W3C Recommendation, Oct. 2003. `http://www.w3.org/TR/2003/REC-MathML2-20031021/`.

[10] R. Battiti. First- and Second-Order Methods for Learning: Between Steepest Descent and Newton's Method. *Neural Computation*, 4:141–166, 1992.

[11] K. Beck. *Extreme Programming Explained: Embrace Change.* Addison-Wesley, 1999.

[12] D. P. Bertsekas. *Nonlinear Programming.* Athena Scientific, 1999.

[13] P. V. Biron and A. Malhotra. XML Schema Part 2: Datatypes, W3C Recommendation, Oct. 2004. `http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/`.

[14] C. M. Bishop. *Neural Networks for Pattern Recognition.* Oxford University Press, 1995.

[15] E. Bonabeau, M. Dorigo, and G. Theraulaz. *Swarm Intelligence: From Natural to Artificial Systems.* Oxford University Press, 1999.

[16] S. J. Breckler. Application of covariance structure modeling in psychology. *Psychological Bulletin*, 107:260–273, 1990.

[17] R. Brits, A. P. Engelbrecht, and F. van den Bergh. Scalability of Niche PSO. In *IEEE Swarm Intelligence Symposium*, pages 228–234, 2003.

[18] Z. Budimlić. *Compiling Java for High Performance and the Internet.* PhD thesis, Rice University, Houston, Texas, 2001.

[19] F. Buschmann, R. Meunier, H. Rohnert, P. Sommerlad, M. Stal, P. Sommerlad, and M. Stal. *Pattern-Oriented Software Architecture, Volume 1: A System of Patterns.* Wiley, 1996.

[20] N. Cliff. Answering ordinal questions with ordinal data using ordinal statistics. *Multivariate Behavioral Research*, 31:331–350, 1996.

[21] P. Coad and J. Nicola. *Object-Oriented Programming.* Pearson, 1993.

[22] O. Cordon, F. Herrera, F. Hoffmann, and L. Magdelena. *Genetic Fuzzy Systems: Evolutionary Tuning and Learning of Fuzzy Knowledge Bases*. World Scientific, 2002.

[23] C. W. Cowell-Shah. Nine Language Performance Round-up: Benchmarking Math & File I/O, 2004. `http://osnews.com/story.php?news_id=5602`.

[24] L. N. de Castro and J. I. Timmis. *Artificial Immume Systems: A New Computational Intelligence Approach*. Springer-Verlag, 2002.

[25] O. P. Doederlein. The Tale of Java Performance. *Journal of Object Technology*, 2(5):17–40, 2003.

[26] M. Dorigo, V. Maniezzo, and A. Colorni. Ant System: Optimization by a colony of cooperating agents. *IEEE Transactions on Systems, Man, and Cybernetics*, 26(1):29–41, 1996.

[27] R. Durbin and D. E. Rumelhart. Product Units: A Computationally Powerful and Biologically Plausible Extension to Backpropagation Networks. *Neural Compuation*, 1:133–142, 1989.

[28] R. C. Eberhart and J. Kennedy. A new optimizer using particle swarm theory. In *Proceedings of the Sixth International Symposium on Micro Machine and Human Science*, pages 39–43, Nagoya, Japan, 1995.

[29] R. C. Eberhart, P. Simpson, and R. Dobbins. *Computational Intelligence PC Tools*. AP Professional, 1996.

[30] R. Elmasri and S. B. Navathe. *Fundamentals of Database Systems*. Addison-Wesley, 2000.

[31] A. P. Engelbrecht. *Computational Intelligence: An Introduction*. Wiley, 2002.

[32] R. E. Filman, T. Elrad, S. Clarke, and M. Aksit. *Aspect-Oriented Software Development*. Addison-Wesley, 2004.

[33] D. Flanagan. *Java in a Nutshell*. O' Reilly, 4th edition, 2002.

[34] D. B. Fogel. *Blondie 24: Playing At The Edge of AI*. Morgan Kaufmann, 2001.

[35] G. Fogel and D. W. Corne. *Evolutionary Computation in Bioinformatics*. Morgan Kaufmann, 2002.

[36] L. J. Fogel. Autonomous Automata. *Industrial Research*, 4:14–19, 1962.

[37] L. J. Fogel. *On the Organization of Intellect*. PhD thesis, University of California, Los Agneles, 1964.

[38] C. M. Fonseca and P. J. Fleming. Genetic Algorithms for Multiobjective Optimization: Formulation, Discussion and Generalization. In *Genetic Algorithms: Proceedings of the Fifth International Conference*, pages 416–423, 1993.

[39] M. Fowler, D. Rice, M. Foemmel, E. Hieatt, R. Mee, and R. Stafford. *Patterns of Enterprise Application Architecture*. Addison-Wesley, 2002.

[40] N. Franken and A. P. Engelbrecht. Comparing PSO Structures to Learn the Game of Checkers from Zero Knowlege. In *IEEE Congress of Evolutionary Computation*, 2003.

[41] E. Gamma, R. Helm, R. Johnson, and J. Vlissides. *Design Patterns: Elements of Reusable Object-Oriented Software*. Addison-Wesley, 1995.

[42] S. Geman, E. Bienenstock, and R. Doursat. Neural Networks and the Bias/Variance Dilemma. (4):1–58, 1992.

[43] J. Ghosh and Y. Shin. Efficient Higher-Order Neural Networks for Classification and Function Approximation. *International Journal of Neural Systems*, 3:323–350, 1992.

[44] R. A. Ghosh. Cooking pot markets: an economic model for the trade in free goods and services on the Internet. *First Monday*, 3(3), 1998. http://www.firstmonday.org/issues/issue3_3/ghosh/index.html.

[45] J. C. Giarratano. *Expert Systems: Principles and Programming*. PWS Publishing, 3rd edition, 1998.

[46] F. Girosi, M. Jones, and T. Poggio. Regularization Theory and Neural Networks Architectures. *Neural Computation*, 7:219–269, 1995.

[47] D. E. Goldberg. *Genetic Algorithms in Search, Optimization and Machine Learning.* Addison-Wesley, 1985.

[48] D. Green. *The Serendipity Machine.* Allen & Unwin, 2004.

[49] C. A. Gunter and J. C. Mitchell. *Theoretical Aspects of Object-Oriented Programming: Types, Semantics, and Language Design (Foundations of Computing).* MIT Press, 1994.

[50] J. Han and M. Kamber. *Data Mining: Concepts and Techniques.* Morgan Kaufmann, 2000.

[51] G. Hardin. The Tragedy of the Commons. *Science*, 162:1243–1248, 1968.

[52] D. Harel. *Algorithmics: The Spirit of Computing.* Addison-Wesley, 1996.

[53] E. R. Harold and W. S. Means. *XML in a Nutshell.* O' Reilly, 3rd edition, 2004.

[54] J. Hertz, A. Krogh, and R. Palmer. *Introduction to the Theory of Neural Computation.* Addison-Wesley, 1991.

[55] D. Hillis. Co-evolving parasites improves simulation evolution as an optimization procedure. Artificial Life II, pages 313–324. Addison-Wesley, 1991.

[56] J. Holland. Outline for a logical theory of adaptive systems. *Journal of the ACM*, 3:297–314, 1962.

[57] S. Hommel. Code Conventions for the Java Programming Language, 1999. `http://java.sun.com/docs/codeconv/`.

[58] A. L. Hors, P. L. Hégaret, G. Nicol, J. Robie, M. Champion, and S. Byrne. Document Object Model (DOM) Level 3 Core Specification, W3C Recommendation, Apr. 2004. `http://www.w3.org/TR/2004/REC-DOM-Level-3-Core-20040407/`.

[59] B. Joy, G. Steele, J. Gosling, and G. Bracha. *Java Lanaguage Specification.* Addison-Wesley, 2nd edition, 2000.

[60] L. Kaufman and P. J. Rousseeuw. *Finding Groups in Data: An Introduction to Cluster Analysis.* Wiley, 1990.

[61] J. Kennedy. Small worlds and mega-minds: Effects of neighborhood topology on particle swarm performance. In *Proceedings of IEEE Congress on Evolutionary Computation*, pages 1931–1938, Washington D.C, USA, July 1999.

[62] J. Kennedy. Bare bones particle swarms. In *Proceedings of the IEEE Swarm Intelligence Symposium (SIS)*, pages 88–94, Indianapolis, USA, April 2003.

[63] J. Kennedy and R. C. Eberhart. Particle swarm optimization. In *Proceedings of IEEE International Conference on Neural Networks*, volume IV, pages 1942–1948, Perth, Australia, 1995.

[64] J. Kennedy and R. Mendes. Population structure and particle swarm performance. In *Proceedings of the IEEE Congress on Evolutionary Computation*, Honolulu, Hawaii USA, May 2002.

[65] H. J. Kesselman, C. Huberty, L. M. Lix, S. Olejnik, R. A. Cribbie, B. Donahue, R. K. Kowalchuk, L. L. Lowman, M. D. Petoskey, and J. C. Keselman. Statistical practices of education researchers: An analysis of their ANOVA, MANOVA, ANCOVA analyses. *Review of Educational Research*, 68:350–386, 1998.

[66] T. Kohonen. *Self-Organizing Maps*. Springer, 1995.

[67] J. R. Koza. *Genetic Programming: On the Programming of Computers by Means of Natural Selection*. MIT Press, 1992.

[68] R. Laddad. *AspectJ in Action: Practical Aspect-Oriented Programming*. Manning, 2003.

[69] Larson, Hostetler, and Edwards. *Calculus*. Heath, 1994.

[70] K. Lea. The Java is Faster than C++ and C++ Sucks. `http://kano.net/javabench/`.

[71] J. A. Lee, A. Lendasse, N. Donckers, and M. Verleysen. A robust nonlinear projection method. In *ESANN*, pages 13–20, 2000.

[72] J. P. Lewis and U. Neumann. Performance of Java versus C++, University of Southern California, 2003. `http://www.idiom.com/~zilla/Computer/javaCbenchmark.html`.

[73] G. P. Liu, J. Yang, and J. F. Whidborne. *Multiobjective Optimisation & Control*. Research Studies Press, 2002.

[74] M. Lovbjerg, T. K. Rasmussen, and T. Krink. Hybrid Particle Swarm Optimiser with Breeding and Subpopulations. In *Genetic and Evolutionary Computation Conference*, 2001.

[75] E. H. Mamdani and S. Assilian. An Experiment in Linguistic Synthesis with a Fuzzy Logic Controller. *International Journal of Man-Machine Studies*, 7:1–13, 1975.

[76] C. Mangione. Performance tests show Java as fast as C++, 1998. `http://www.javaworld.com/javaworld/jw-02-1998/jw-02-jperf_p.html`.

[77] E. Mayr. *Animal Species and Evolution*. Belknap, 1963.

[78] R. Mendes, J. Kennedy, and J. Neves. Watch thy neighbor or how the swarm can learn from its environment. In *Proceedings of the IEEE Swarm Intelligence Symposium (SIS)*, pages 88–94, Indianapolis, USA, April 2003.

[79] L. Messerschmidt and A. P. Engelbrecht. Learning to Play Games using a PSO-based Competitive Learning Approach. In *Asia-Pcific Conference on Simulated Evolution and Learning*, 2002.

[80] S. J. Metsker. *Design Patterns C#*. Addison-Wesley, 2004.

[81] T. Micceri. The unicorn, the normal curve, and other improbable creatures. *Psychologica Bulletin*, 105:156–166, 1989.

[82] R. E. Michod. *Darwinian Dynamics*. Princeton University Press, 2000.

[83] P. B. Miltersen. MILP, ILP and TSP: Course notes for Search and Optimization, 2004. `http://www.daimi.au.dk/dSoegOpt/ilp.pdf`.

[84] T. M. Mitchell. *Machine Learning*. McGraw-Hill, 1997.

[85] N. J. Nilsson. *Artificial Intelligence: A New Synthesis*. Morgan Kaufmann, 1998.

[86] C. Nock. *Data Access Patterns: Database Interactions in Object-Oriented Applications*. Addison-Wesley, 2003.

[87] U. Paquet and A. P. Engelbrecht. A New Particle Swarm Optimiser for Linearly Constrained Optimisation. In *Congress on Evolutionary Computation*, 2003.

[88] W. Pedrycz. *Computational Intelligence: An Introduction.* CRC Press, 1998.

[89] E. S. Peer, A. P. Engelbrecht, and F. van den Bergh. CIRG@UP OptiBench: A statistically sound framework for benchmarking optimisation algorithms. In *IEEE Congress on Evolutionary Computation*, 2003.

[90] E. S. Peer, F. van den Bergh, and A. P. Engelbrecht. Using Neighbourhoods with the Guaranteed Convergence PSO. In *Proceedings of the IEEE Swarm Intelligence Symposium (SIS)*, pages 235–242, Indianapolis, USA, April 2003.

[91] M. A. Potter and K. A. de Jong. A Cooperative Coevolutionary Approach to Function Optimization. In *The Third Parallel Problem Solving from Nature*, pages 249–257, 1994.

[92] E. S. Raymond. *The Cathedral and the Bazaar: Musings on Linux and Open Source by an accidental revolutionary.* O' Reilly, 2nd edition, 2001.

[93] I. Rechenberg. *Evolutionsstrategie: Optimierung technischer Systeme nach Prinzipien der Biologischen Evolution.* Frommann-Holzboog, 1973.

[94] I. Rechenberg. *Evolutionsstrategie.* Frommann-Holzboog, 1994.

[95] K. Reinholtz. Java will be faster than C++. *ACM SIGPLAN Notices*, 35(2):25–28, 2000.

[96] R. G. Reynolds. An Introductions to Cultural Algorithms. In *Conference on Evolutionary Computing*, pages 131–139, 1994.

[97] R. M. Roberts. *Serendipity: Accidental Discoveries in Science.* Wiley, 1989.

[98] D. Schmidt, M. Stal, H. Rohnert, and F. Buschmann. *Pattern-Oriented Software Architecture, Volume 2, Patterns for Concurrent and Networked Objects.* Wiley, 2000.

[99] A. C. Schultz, L. E. Parker, and F. E. Schneider, editors. *Multi-Robot Systems: From Swarms to Intelligent Automata*, volume 2. Kluwer Academic Publishers, 2003.

[100] Y. Shi and R. C. Eberhart. A modified particle swarm optimizer. In *Proceedings of the IEEE Congress on Evolutionary Computation*, pages 69–73, Anchorage, Alaska, May 1998.

[101] Y. Shi and R. C. Eberhart. Empirical study of particle swarm optimisation. In *Proceedings of the IEEE International Congress on Evolutionary computation*, pages 101–106, 1999.

[102] J. A. Snyman. A New and Dynamic Method for Unconstrained Minimization. *Applied Mathematical Modelling*, 6:449–462, 1982.

[103] F. Solis and R. Wets. Minimization by random search techniques. *Mathematics of Operations Research*, 6:19–30, 1981.

[104] D. Spiller and T. Wichmann. Basics of Open Source Software Markets and Business Models, Free/Libre Open Source Software: Survey and Study, 2002. `http://www.berlecon.de/studien/downloads/200207FLOSS_Basics.pdf`.

[105] R. M. Stallman, L. Lessig, and J. Gay. *Free Software, Free Society: Selected Essays of Richard M. Stallman*. Free Software Foundation, 2002.

[106] A. G. W. Steyn, C. F. Smit, S. H. C. du Toit, and C. Strasheim. *Modern Statistics in Practice*. J. L. van Schaik, 2nd edition, 1996.

[107] M. Su, T. A. Liu, and H. T. Chang. An Efficient Initialization Scheme for the Self-Organising Feature Map Algorithm. In *IEEE IJCNN*, 1999.

[108] P. N. Suganthan. Particle Swarm Optimiser with Neighbourhood Operator. In *IEEE Congress of Evolutionary Computation*, 1999.

[109] T. Bäck, D. B. Fogel, and Z. Michalewicz. *Evolutionary Computation 1: Basic Algorithms and Operators*. Institute of Physics Publishing, 2000.

[110] T. Takagi and M. Sugeno. Fuzzy Identification of Systems and its Application to Modeling and Control. *IEEE Transactions of Systems, Man, and Cybernetics*, 15(1):116–132, 1985.

[111] W. Theunissen, A. Boake, and D. G. Kourie. A Preliminary Investigation of the Impact of Open Source Software on Telecommunication Software Development. In *Southern African Telecommunication Networks & Applications Conference (SANTAC)*, 2004.

[112] H. S. Thompson, D. Beech, M. Maloney, and N. Medelsohn. XML Schema Part 1: Structures, W3C Recommendation, Oct. 2004. `http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/`.

[113] F. van den Bergh. *An Analysis of Particle Swarm Optimizers*. PhD thesis, Department of Computer Science, University of Pretoria, South Africa, 2002.

[114] F. van den Bergh and A. Engelbrecht. A new locally convergent particle swarm optimizer. In *Proceedings of IEEE Conference on Systems, Man and Cybernetics*, Hammamet, Tunisia, Oct. 2002.

[115] N. Walsh and L. Muellner. *DocBook: The Definitive Guide*. O' Reilly, 1999.

[116] P. J. Werbos. *Beyond Regression: New Tools for Prediction and Analysis in the Behavioural Sciences*. PhD thesis, Harvard University, Boston, USA, 1974.

[117] R. P. Wiegand. *An Analysis of Cooperative Coevolutionary Algorithms*. PhD thesis, George Mason University, Virgina, 2003.

[118] P. M. Williams. Bayesian Regularization and Pruning Using a Laplace Prior. *Neural Computation*, 7:117–143, 1995.

[119] I. H. Witten and E. Frank. *Data Mining: Practical Machine Learning Tools and Techniques with Java Implementations*. Morgan Kaufmann, 1999.

[120] D. H. Wolpert and W. G. Macready. No free lunch theorems for search. Technical Report SFI-TR-95-02-010, Santa Fe Institute, July 1995.

[121] D. H. Wolpert and W. G. Macready. No free lunch theorems for optimization. *IEEE Transactions on Evolutionary Computation*, 4:67–82, 1997.

[122] X. Xie, W. Zang, and Z. Yang. A dissipative particle swarm optimization. In *IEEE Congress on Evolutionary Computing*, 2002.

[123] F. Yergeau, T. Bray, J. Paoli, C. M. Sperberg-McQueen, and E. Maler. Extensible Markup Language (XML) 1.0, W3C Recommendation, Feb. 2004. `http://www.w3.org/TR/2004/REC-xml-20040204/`.

[124] C. H. Yu. An Overview of Remedial Tools for the Violation of Parametric Test Assumptions in the SAS System. In *Western Users of SAS Software Conference*, 2002.

[125] L. A. Zadeh. Fuzzy Sets. *Information and control*, 8:338–353, 1965.

[126] L. A. Zadeh. The Concept of a Linguistic Variable and its Application to Approximate Reasoning - I. *Information Sciences*, 8:199–249, 1975.

[127] L. A. Zadeh. The Concept of a Linguistic Variable and its Application to Approximate Reasoning - II. *Information Sciences*, 8:301–357, 1975.

[128] L. A. Zadeh. The Concept of a Linguistic Variable and its Application to Approximate Reasoning - III. *Information Sciences*, 9:43–80, 1975.

[129] Y. Zhang and A. Kandel. *Compensatory Genetic Fuzzy Neural Networks and Their Applications*. World Scientific, 1998.

[130] H. Zimmermann, G. Tselentis, M. V. Someren, and G. Dounias. *Advances in Computational Intelligence and Learning: Methods and Applications*. Kluwer Academic Publishers, 2002.

Appendix A

List of Acronyms and Abbreviations

Acronym: Abbreviated Coded Rendition Of Name Yielding Meaning

AFL: Academic Free License

AI: Artificial Intelligence

AIS: Artificial Immune System

AL: Artistic License

API: Application Programming Interface

ASL: Apache Software License

BMP: Bean Managed Persistence

CI: Computational Intelligence

CiClops: Computational Intelligence Collaborative Laboratory Of Pantological Software.

CILib: Computational Intelligence Library[1]

CIRG@UP: The Computational Intelligence Research Group at the University of Pretoria[2].

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[1]http://cilib.sourceforge.net
[2]http://cirg.cs.up.ac.za

CMP: Container Managed Persistence

CPL: Common Public License

CPU: Central Processing Unit

CVS: Concurrent Versioning System

DOM: Document Object Model

DPSO: Dissipative PSO

DTD: Document Type Definition

EC: Evolutionary Computing

EJB: Enterprise Java Bean

EP: Evolutionary Programming

ES: Evolutionary Strategies

GA: Genetic Algorithm

GC: Garbage Collection

GCC: GNU Compiler Collection

GNU: GNU's Not Unix

GoF: Gang of Four (Gamma, Helm, Johnson, Vlissides)

GPL: General Public License

GUI: Graphical User Interface

HTML: HyperText Markup Language

I/O: Input/Output

J2EE: Java 2 Enterprise Edition

JCP: Java Community Process

JFC: Java Foundation Classes

JIT: Just In Time

JMS: Java Messaging Service

JNDI: Java Naming and Directory Interface

JVM: Java Virtual Machine

LGPL: Lesser General Public License

LVQ: Learning Vector Quantiser

NN: Neural Network

NP: Nondeterministic Polynomial-time

OMG: Object Management Group

OOP: Object Oriented Programming

OSD: Open Source Definition

OSI: Open Source Initiative

OSL: Open Software License

OSS: Open Source Software

PSO: Particle Swarm Optimiser

RPC: Remote Procudure Call

SAX: Simple API for XML

SDK: Software Developer Kit

SI: Swarm Intelligence

SOFM: Self-Organising Feature Map

SSE: Sum Squared Error

TSP: Travelling Salesman Problem

UML: Unified Modelling Language

W3C: World Wide Web Consortium

XML: eXtensible Markup Language

Appendix B

Unified Modelling Language

The notation used for class structure diagrams in this dissertation is based on the Object Management Group (OMG) Unified Modelling Language (UML) specification [2]. Diagrams were composed using the open source Dia[1] tool, which has some minor flaws in terms of formatting and strict conformance to the UML specification. Nonetheless, the diagrams still serve their intended purpose of effectively communicating class structure and relationships.

ExampleClass

+staticAttribute
+publicAttribute: AttributeType
-privateAttribute
#protectedAttribute

+method(): ReturnType ○ - - - - - - - - - - - - Annotation
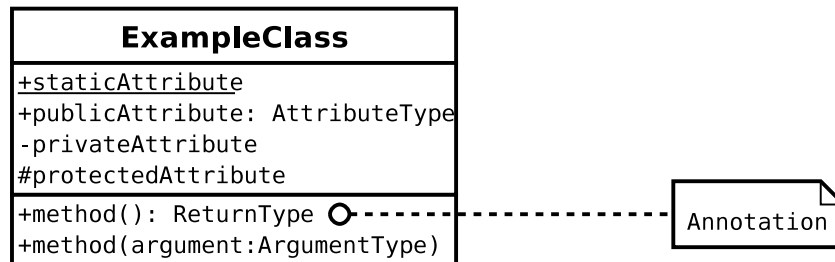+method(argument:ArgumentType)

Figure B.1: Example UML Class

Figure B.1 illustrates how a class is represented in UML. The top rectangle contains the class name, the middle contains attributes, or fields, and the bottom contains methods, or operations. The prefix of a plus, minus or hash symbol in front of a class member indicates public, private and protected access modifiers respectively. Class scope, or static, members are underlined. In general, an identifier's type follows after its declaration, preceded by a colon. Method return types are declared to the right of the method

---

[1]http://www.gnome.org/projects/dia/

definition, and method parameters are indicated within parentheses. While the class name must always be specified, method and attribute blocks may be omitted to simplify a diagram. Annotations are depicted by a piece of paper with a folded corner. Although not shown in the example, abstract operations and class names are indicated in italics.
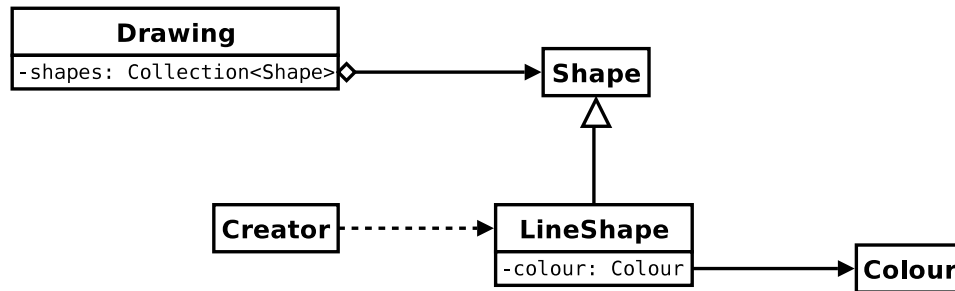

Figure B.2: UML Relationships

Figure B.2 shows the possible relationships between classes. Inheritance is indicated by a line with an open triangle pointing towards the base class. A line that starts with a diamond represents an aggregation relationship where the arrow points to the class that is aggregated. Acquaintance, or simply an object reference, is denoted by an arrow line without a diamond. Whenever possible, the starting point of aggregate or acquaintance arrows are aligned with the attributes taking part in the relationship. Finally, object instantiation is indicated by a dotted line with an arrow pointing from the creating class to the created class.

Appendix C

The Open Source Definition

Open source doesn't just mean access to the source code. The distribution terms of open-source software must comply with the following criteria:

C.1   Free Redistribution

The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.

C.2   Source Code

The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost, preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

C.3   Derived Works

The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.

C.4   Integrity of The Author's Source Code

The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

C.5   No Discrimination Against Persons or Groups

The license must not discriminate against any person or group of persons.

C.6   No Discrimination Against Fields of Endeavor

The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

C.7   Distribution of License

The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.

C.8   License Must Not Be Specific to a Product

The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom

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C.9 License Must Not Restrict Other Software

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

C.10 License Must Be Technology-Neutral

No provision of the license may be predicated on any individual technology or style of interface.

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Appendix D

GPL Approval Letter

University of Pretoria
Pretoria 0002
Republic of South Africa
http://www.up.ac.za

Department of Research
Support and Development,
Contracting

ATTN: Mr. Edwin Peer, MSc Student
Supervisor: Prof AP Engelbrecht
Department of Computer Science

Dear Edwin

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http://contracting.up.ac.za

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Appendix E

Popular Open Source Licenses

E.1   Academic Free License (AFL)

Version 2.1

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APPENDIX E. POPULAR OPEN SOURCE LICENSES 194

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Version 2, June 1991

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Version 2.1, February 1999

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    "Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

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   (b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

   (c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

   (d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

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These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

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   This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

   If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

   However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

   When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

   If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

   Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

   You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

   (a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which

must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

(b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

(c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

(d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

(e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

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