SEG SOFTWARE FAULT

LANGUAGE & ROLES

PHASE 1 DOCUMENTATION

V1.24

24/02/2012

About Us

SEGFAULT SOFTWARE Powering your business	SegFault Software is a software house, employing more than 4,000 people over 12 countries. Combining unparalleled experience, exhaustive capabilities across all industries and business functions, and extensive knowledge on the world's largest companies, SegFault Software collaborates with clients to help them become efficient high-performance entities. The company generated revenues of GBP £182.5 million for the fiscal year ended Mar. 31, 2011.

Staff Biographies

Thomas Hughes Technical Author h005481a@student.staffs.ac.uk	Thomas Hughes first joined the company in 2012 after a long fruitful career as a Footballing megastar, most notable for scoring the winning goal in the 2012 European Championships final for England. He then decided to radically change his career and become a technical author at SegFault, making use of his degree in Computer Science which he obtained in 1998. Thomas currently resides in London although he is known to enjoy travelling all around the world.

Mark Robinson Java Team Leader r006709a@student.staffs.ac.uk	Mark Robinson has been with the company as a software developer from its founding. His tenure has seen him work on a plethora of software projects covering all industry sectors. This has made him highly experienced with a vast range of programming languages and techniques. He has published several research papers on software development theory including "SCRUM Development Techniques" and "Utilising Cloud Computing to Enable Remote Medical Diagnosis".

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	Mark Robinson graduated from Staffordshire University with an MSc in Computer Science in 1996 and acquired MS MCPD and SANS GSSP certifications in 1999.

Matthew Ryder C# Developer r004581a@student.staffs.ac.uk	Matthew is a computer scientist with a focus on computer operating systems; he has worked at Microsoft as a consultant, on the Windows ME and Vista teams before moving to SegFault in 2009. He is the author of the best-selling book "UNIX Systems, Who Needs 'Em?" and co-author of "Windows Vista for Dummies". He currently resides in London with his wife, two children and three dogs; Jasper, Esbern and Patches.

Peter Ellsum C++ Developer ew000559@student.staffs.ac.uk	Peter Ellsum has been with the company for several years since starting his career with SegFault as a junior programmer. He has been repeatedly published in respected journals on the subject of software development and design including such pieces as "Objective C. Why!?" and "Quaternion matrix mathematics and your path to fewer migraines". Peter Ellsum graduated from Staffordshire university in 2004 with a MEng in Computer science has been with SegFault ever since.

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Revision History

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19/01/2012	V1.00	Wrote staff bio	Mark Robinson
19/01/2012	V1.00	Wrote staff bio	Matthew Ryder
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04/02/2012	V1.00	Plan	Mark Robinson
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23/02/2012	V1.24	Software Quality Plan and Software Quality Assurance Plan	Mark Robinson

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Software Requirements Specification

1 Introduction

1.1 Purpose

This Software requirements specification (SRS) details all the requirements the Language and Roles program should meet and the problems it must solve. It will detail all the things that the program must do and all the things it must not do along with the schedule and projected cost of the project.

1.2 Scope

Language and Roles (L&R) promises to be a fun and educational game aimed at teaching primary school children about roles and professions.

The game will offer both testing and teaching capabilities to help develop pupil's understanding of the place of roles and professions in society, and the language used to refer to them. The program will include a wide range of questions based on a wide range of roles and will have the facility for teachers to add their own questions and answers. It will also provide tracking of pupil's results and graphical visualisations of the tracking data to assist the teacher in future lesson plans.

The game will be suitable for all children of UK primary school age (4-10 years) both in content suitability and difficulty. The game will be entertaining and easy to use so that necessary teacher involvement is minimal.

1.3 Definitions

- L&R – Language and Roles, the proposed software program
- UI – User Interface, what the teacher and pupil will interact with to make use of the program
- GUI – Graphical User Interface, an interface that utilizes buttons and images to present an intuitive interface that can be interacted with via a mouse
- CLI – Command Line Interface, a text based interface where all input must be typed, there is no usage of a mouse
- Implementation – The section of the software development cycle where the actual software is produced
- TCP/IP – Transmission Control Protocol/Internet Protocol, a group of networking methods commonly used to access the internet

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- TCP/IP Compliant – Transmission Control Protocol/Internet Protocol - Equipment is said to be TCP/IP compliant when it is capable of TCP/IP. If the equipment is able to connect to the internet then it is TCP/IP compliant.
- MFL – Modern Foreign Languages, living foreign languages i.e. French, German, Spanish
- Executable – The part of a program which your computer runs
- IP Address – Internet Protocol Address - The Address used to route data over a TCP/IP network
- Px – Pixel – The smallest discrete component of an image
- Runtime Error – An error which occurs in the code when running the program
- Hardcoded – An item of data or feature which is written into the program and cannot be changed
- Dynamic – Something that will not always be the same opposed to static where it will always be the same
- SQA – Software Quality Assurance – Assures that all parts of the project are high quality including the documentation, software and development process itself
- L&RPT – Language & Roles Project Team – The team responsible for the development of the software and documentation for this project
- Project Team – The team responsible for the production of the project including all software development and non-software development staff
- QSD Certification – Quality Software Developer Certification – A certification that all software developers at SegFault Software must attain to become developers. It covers good programming and project development practices. All developers must repeat the assessment annually to keep their certification and therefore job title.
- SQP – Software Quality Plan – Describes the standards which the project will adhere to make L&R a high quality product

1.4 Applicable Documents

This document is IEEE 830 compliant: http://standards.ieee.org/findstds/standard/830-1998.html

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1.5 Overview

The rest of this document will cover the general description and specific specification of the Language and Roles program. The schedule, costing and risk analysis are also included.

2 Overall Description

2.1 Product Perspective

2.1.1 Hardware

2.1.1.1 Hardware Interfaces

2.1.1.1.1 Input

The software will be interfaced largely with a standard mouse which has at least one button. The pupils will not have to use anything for input apart from the mouse.

A keyboard will be used for complex input by the teacher. This includes authentication of the teacher as their account requires more security than the pupils as they have the ability to manage the pupils' games. New questions and answers will also be added to the games via the keyboard.

2.1.1.1.2 Output

Output will be largely via the monitor with it being used to display the GUI. This includes the authentication screen, game itself and configuration options.

There will also be limited audio output to allow blind users to play the game and teach a class using the software. However this will use a synthesised voice and so cannot be used viably as a pronunciation aid for foreign languages, but just accessibility assistance.

2.1.1.2 Networking

To allow teachers to add questions and answers to the system and to allow them to set pupils tests a standard TCP/IP network shall be used.

2.2 Product Features

2.2.1 General

Teachers, pupils and system administrators will all use the same program regardless of the fact that they may want to do different tasks. When the program is run it will present the user with a login screen where they can choose what type of user they

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are and then specifically who they are. Teachers' and System Administrators' accounts will be protected by both a username and password which will be typed in to provide the maximum level of security which is necessary as they can alter the program's configuration and manage games on other computers.

Both the test and game will be made up of multi choice questions with 5 options. These questions will be of both question and answer style i.e. *"Who puts out fires?"* and fill in the blank style i.e. *"_____ puts out fires"*. The initial questions and answers will all be in British English however the system will support foreign languages for MFL teaching.

The blanks will be represented by a range of 5 to 8 underscores, the exact number being randomly generated to prevent pupils guessing the answer based on their length. The answers will be arranged in a random order to prevent pupils from simply learning the position of the correct answers in the answer lists. Wrong answers will be added to the list dynamically to help prevent pupils consistently working out the answer via elimination.

Teachers will be able to add their own questions and answers to the game which will distributed to all the other installations of the game over the network. Content packs purchasable from SegFault Software will also be able to be added which will include additional questions in English and other languages.

Support will be supplied to the teachers via a manual aimed at PC literate teachers and 2 years of phone support (within working hours). Initial setup shall also be supplied.

2.2.2 Teaching

The teaching part of the game will utilise the same questions as the test however the questions will be selected as per the pupil's specification. Random questions that meet the criteria will then be presented to the pupil.

When the pupil answers a question they will be shown if their answer was correct and if they chose incorrectly then the correct answer will be highlighted to them. If a question is answered incorrectly it shall be presented to the pupil again after 2 questions.

If a pupil answers a question correctly they will be awarded 1 point and the pupil will be played the sound of applause. If a pupil answers 5 questions in a row correctly they will be awarded a bronze star, 10 questions in a row will result in a silver star and 15 questions in a row for a gold star.

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The pupil will be presented with their current score and the number of questions they have answered. Scores will not be sent to the teacher and no records will be kept.

2.2.3 Testing

The teacher will be able to create a custom standardised test or choose from saved tests which were created previously. The production of these tests can be done manually with the assistance of a search function which allows the teacher to search for questions via a range of criteria. Tests can also be generated by scripts which will generate a test based on a set of criteria. Incorrect answers will be added to each question dynamically, so that the same question presented to two different pupils may have different incorrect answers. They will be randomly ordered to help reduce cheating and make test creation easier.

When a test has been chosen it can be sent out to a specified range of logged in pupils which can be selected by name or ID number. This test will then be sent out to all the specified pupils over the network.

When a test is received pupils will be notified of its arrival and will be able to take the test. The questions themselves will be randomly ordered as will the multi choice answers. When questions are answered the pupil will not be shown if they answered correctly or incorrectly and no score will be shown to the pupil. There will be a 50/50 option which will take away 2 random incorrect answers, if the pupil answers with the correct answer now they will be awarded 1 point opposed to the 3 points they would have been awarded if they had not used the option.

When a test has been completed the results shall not be shown to the pupil but they shall be sent to all other installations of the game over the network, this will prevent low ability pupils being demoralized by a low score.

At the teacher's program the incoming results will be compiled together along with past results. The teacher can then compare these results against one another and to past results via a range of graphs and statistical methods.

Whilst pupils will not be able to see their raw results they will be able to view a leader board on completion of the test. This will rank the pupils based on the amount they have improved.

2.3 User Characteristics

2.3.1 Pupil

The pupil's will be able to do tests issued by a teacher over the network and play the game. However they will not be able to issue tests to one another or their teacher.

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They will not have any access to past results of themselves or other pupils or any configuration data.

All pupils will be between the ages of 4 and 10 years old this must be taken into account in terms of the language used not just in the game content itself but in the UI too. This must also be taken into account when designing the UI especially considering some may have learning and/or coordination difficulties.

2.3.2 Teacher

Teachers can create and issue tests to pupils however cannot have tests issued to them. Teachers can play the game, for demonstration purposes or to play it as a group with younger classes. They can also add questions, answers and content packs to themselves and the pupils' games over the network.

They will have administration capabilities, this is not because they are expected to have the skills required but because this enables phone support and online documentation to be effective methods of assistance reducing the requirements for onsite support.

Teachers or the teaching assistant or cover supervisor who may be running the class on their instruction will all be over 18. Therefore the UI can use more complex language.

2.3.3 System Administrator

System administrators and service personnel will use a guest account which will be exactly the same in capability as a teacher's. The reason they will have their own account and not just use a teacher's is because people tend to reuse passwords and so it would be unwise to give a teacher's login details to service personnel.

2.4 Constraints

The program must run on a standard IT suite PC.

- Intel Core Duo 2.3 GHz processor
- 2GB RAM
- Intel GMA 3100 graphics
- 1024 x 768 display mode
- Operating System: Microsoft Windows XP Professional Version 5.1.2600 Service Pack 2 Build 2600
- Other application software: Office 2007, Internet Explorer 8, Firefox 3.0.19

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- TCP/IP Network

2.5 Assumptions and dependencies

This specification has been made assuming that the description provided by the client has not changed.

3 Specific Requirements

3.1 Functionality

3.1.1 Login

- Every person, including: pupils, teachers and system administrators, will have a unique identifier
- Teachers and system administrators will be able to login with both a unique identifier and password
- 2 Teachers/system administrators may have the same password but may not have the same unique identifier
- Pupils will be able to login by selecting their name from a searchable list
- Two pupils will not be able to have the same name (if this occurs we suggest using a middle initial)
- The system will support at least 1000 pupils in the name list
- The system will support at least 100 teacher username and password pairs
- All users pupil, teacher or system administrator will have to login before they can access the rest of the game

3.1.2 General Game Functionality

- Every question will have exactly 5 options labelled ‘A’ to ‘E’
- Incorrect options will be added to the list dynamically
- Options will be in the alphabetical order of their labels which will be assigned to options randomly
- The pupil will only be able to select exactly one answer per question
- Only one answer out of the five shall be correct

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- Only one question will be viewable at a time
- Questions will be categorised by language and skill level criteria
- The skill level criteria will be numbered 4 – 15 which will correspond to the reading age of the question in the origin country of the language i.e. UK reading age for English, Spain's reading age for Spanish
- Pupils will be able to enable a text to speech option on each individual question which will cause a synthetic voice to read the question and options aloud

3.1.3 Teaching Functionality – Applies to just the teaching part of the game

- The pupil will be able to select the types of questions they receive by skill level and language
- When the pupil chooses a correct answer the text will turn green and the sound of applause will be played
- When the pupil chooses an incorrect answer the text will turn red
- The pupil will constantly be presented with the number of questions they have answered and the number they have answered correctly
- If a pupil answers a question wrong they will be presented with it again after 2 questions

3.1.4 Test Functionality – Applies to just the testing part of the game

3.1.4.1 Test Creation and Distribution

- Previously saved tests can be reused
- Tests can be created by defining: the number of questions, the skill level and the language.
- Generated tests can be reviewed by the teacher after generation and before distribution
- Tests can be created manually by selecting individual questions to include
- During manual creation the visible questions will be filterable by skill level and language
- After the production of the test the test will be saved for later use

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- All saved tests will have a unique name which can be chosen by the teacher and an author which will be the teacher's unique identifier
- All saved tests will be distributed to all clients over the network so that they can be recalled from any installation of the game
- Created tests can be reviewed by the teacher before they are distributed
- Tests will be distributed by their user identifier
- When configuring the test distribution the teacher will be presented with a list of logged on pupils to choose to distribute the test to

3.1.4.2 Test Completion

- 3 points for a correct answer will be awarded except if the 50/50 option has been used in which the pupil will receive 1 point
- A 50/50 option will remove 2 incorrect answers at random
- Questions will be delivered to the pupil in a random order
- Pupils will not be shown their scores either during the test or upon its completion
- Pupils will not be shown whether they answer a question correctly or not
- Test results shall be transmitted to all other running installations of the game on test completion
- When all pupils have completed the test and all games have received all the results and if the pupils have previously completed the test then they will be a presented with a list of the most improved pupils. This will be calculated by comparing their new result with their last result and presented as a percentage.

3.1.4.3 Test Results

- Test results will include: whether each question was answered correctly or incorrectly, whether they used the 50/50 option or not on each individual question, the question identifier and
- All test results will be saved to all clients
- Test results will not be accessible by pupils
- All teachers can access test results from any test distributed by any teacher

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- Teachers will be able to view the results from a test as a bar chart of incorrect or correct answers
- Individual pupil's results will be viewable as a scatter graph with a line of best fit to visualize a pupil's progress

3.2 Usability and Accessibility

- A GUI will be used for all parts of the program
- The entire UI will be written in British English
- Within the pupil's section of the program the UI will use the language corresponding with a British reading age of 4 years old
- All buttons in the pupil section will be at least 150*50px

3.3 Performance

- Distribution of new questions and answers will take a maximum 1 second per client per question/answer pair over a 100mb/s TCP/IP network
- Distribution of new results over the network will take at most 5 seconds per client over a 100mb/s TCP/IP network
- Distribution of new configuration options will take at most 5 seconds per client over a 100mb/s TCP/IP network
- Results of tests must be accurately transmitted to the other installations of the program
- Any runtime errors will ask the pupil to notify the teacher
- When searching for a pupil the program should return the result from a search from 1000 users in 5 seconds or less
- Teachers will be able to login to the system after at most 5 seconds after the submission of the correct username and password

3.4 Supportability

- A backup teacher/system administrator account will be hardcoded into the backup to prevent someone from deleting all the accounts which would lock out all access to the program

3.4.1 Hardware

The system must run on a computer with this specification

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- Intel Core Duo 2.3 GHz processor
- 2GB RAM
- Intel GMA 3100 graphics
- 1024 x 768 display mode
- Operating System: Microsoft Windows XP Professional Version 5.1.2600 Service Pack 2 Build 2600
- Other application software: Office 2007, Internet Explorer 8, Firefox 3.0.19
- TCP/IP Network

3.4.2 Content Update

- Custom content can be added by the teacher
- Content packs can out multiple questions and answers in one action
- Added questions will be distributed to all other installations of the software which are listed
- Both custom content added by teachers and content packs will be distributed to all clients described in the IP address list

3.4.3 Configuration

- All configuration options will be viewable within the program after a teacher or system administrator logs in
- All configuration options will be editable from within the program after a teacher or system administrator logs in
- Configuration options will include:
    - List of client IP addresses
    - Inbound port number
    - Outbound port number
    - The current teacher's/system administrator's password
    - List of pupils names
    - List of teachers/system administrators

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- If changed configuration options will be distributed over the network to all clients described in the IP address list
- If options have not been changed but simply viewed they will not be distributed
- The program will not allow you to enter external or illegal addresses i.e. 123.456.789.0
- The program will not allow you to enter illegal ports i.e. 10000000
- The teacher will be able to remove any specific IP address form the list
- Passwords must be at least 8 characters long
- The teacher will be able to add and remove pupils from the list of names
- The teacher/system administrators will be able to add teachers/system administrators
- The teacher/system administrators will be able to remove all teachers/system administrators apart from the hardcoded backup account

3.5 Design Constraints

- The program must run on Microsoft Windows XP Professional Version 5.1.2600 Service Pack 2 Build 2600
- The program, including all components except for the questions and answers themselves, must not use more than 100MB of backing store storage space

3.6 User Documentation and Help Requirements

3.6.1 User Documentation

- Aimed at teachers who are new users of Language and Roles and are PC literate
- One (1) print copy and a digital copy in .PDF and .DOCX format supplied with each application CD-ROM and available online at

  www.segfaultsoftware.co.uk/support

3.6.2 Phone Support

- Available 9am – 5pm (GMT)
- Available for 2 years starting at product delivery
- Available to staff members only, not pupils

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3.7 Purchased Components

All components will be either made by SegFault Software or available for free i.e. .Net redistributable runtimes.

3.8 Interfaces

3.8.1 User Interfaces

- All parts of the software will be accessible via a GUI

3.8.2 Hardware Interfaces

- The pupil part of the software will primarily use the mouse
- All navigation will utilize the mouse
- The teacher/system administrator will use the keyboard for submission of complex data such as IP addresses and new questions
- Output will primarily be via the monitor
- Speakers or headphones will be used to output audio such as the synthetic speech output and sound effects though these are not critical for the game to work

3.8.3 Communications Interfaces

- A standard TCP/IP network will be used for the distribution of questions, answers and configuration details.

3.9 Licensing Requirements

- Non-transferable
- Non-sub licensable
- Unlimited installations within the school
- 2 years duration
- Includes L&R software, installation, presentation, documentation and 2 years of phone support
- Costs only £4,495

Full licence available in appendixes.

3.10 Legal, Copyright, and Other Notices

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4 Schedule

The information provided here is just a summary of the full schedule details available in the appendixes.

Phase	Start Date	Finish Date
Phase 1	16/01/2012	24/02/2012
Phase 2	24/02/2012	16/03/2012
Phase 3	16/03/2012	26/04/2012
Phase 4	16/03/2012	26/04/2012

4.1 Phase 1

This stage includes:

- Assembling of a suitable development team
- Analysis of the duration of the project and the creation of an appropriate schedule
- Analysis and evaluation of risks to the project
- Analysis of the project requirements and the amalgamation of the results into this document

4.2 Phase 2

This stage includes:

- The review of the documentation from phase 1 with the client
- Fine tuning of the analysis documentation to adjust it to fit the client's needs perfectly

4.3 Phase 3

This stage includes:

- Technical design of the proposed game
- Creation of the game software and content

- Testing the resultant program for technical, suitability and usability faults
- Evaluation of the project to assist with the production of future versions of Language & Roles and other SegFault Software projects

4.4 Phase 4

This stage includes:

- Production of a presentation which demonstrates the software's features, the reasons behind them and the development process
- Delivery of said presentation to the staff at Hilton's Academy for the Morally Upright
- Installation of the program on the school's computers

5 Costing

The information provided here is just a summary of the full costing information available in the appendixes.

5.1 Initial Cost

The client can choose from two possible methods of payment for the project:

5.1.1 Full Purchase

Item	Cost
Equipment	£5,330.01
Office	£7,554.78
Staff	£65,591.95
Expenses	£750.00
Corporate Fees	£92,685.59
Gross Total	£171,912.33
Vat (20%)	£34,382.47
Net Total	£206,294.80

The client can choose to pay for the entire project at a cost of £185,345.41 and retain all intellectual property rights. This price includes installation and 2 years of phone support to the teachers and system administrators.

5.1.2 Licence

Item	Cost
Language & Roles	£1077.78
Phone Support (2 Years)	£2,000.00
Installation	£1,084.72

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Gross Total	£4,162.50
Vat (20%)	£832.50
Net Total	£4,995.00

The details of this licence are listed above (4.10 Licensing Requirements)

5.1.2.1 Licence Summary

- 2 years in length
- Unlimited installs
- Non-transferable
- Non-sub-licensable

5.2 Additional Items

There are a variety of additional services which can be purchased alongside either of the above options. Language packs are purchased as an indefinite, non-transferable, non-sub-licensable licence for unlimited installs.

Item	**Cost (Net)**
Phone Support (1 Year)	£1800.00
German Language Pack	£12600.00
French Language Pack	£12600.00
Spanish Language Pack	£12600.00
Russian Language Pack	£15000.00
Italian Language Pack	£15000.00
Portuguese Language Pack	£15000.00
Dutch Language Pack	£15000.00

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6 Risk Analysis

6.1 Risk Identification

Risk	Type	Description
Requirements Change	Project / Artefact	The customer adds or changes requirements during the project thereby invalidating the project plan and extending development time.
Requirements Unmet	Project / Artefact	Requirements that are not met due to poor requirements specification or development failure.
Undocumented Requirements	Project	Requirements the customer expects the software to meet that have not been defined during the planning phase.
Insufficient Research	Project	Insufficient research by the project management. Leading to issues with competitors and the customer later in the project development cycle.

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Risk	Type	Description
Poorly Defined Requirements	Project / Artefact	Requirements are defined poorly. May lead to the software not meeting the customers' expectations or wasted development time.
Delayed Specification	Project	The customer may be unreachable or indecisive
Underestimated Scope	Project / Artefact	Feature scope is underestimated leading to backtracking and plan changes.
Feature Creep	Project / Artefact	Features are constantly added without proper planning.
Hardware Unavailability	Project	Hardware being non-functional or unfit for purpose.
Hardware Failure	Project	Hardware failure during development may cause loss of data.
Asset Copyright	Project/Artefact	Copyright disputes over assets such as third party libraries and graphics.
Staff Turnover	Project	Staff leaving for other companies.
Management Change	Project	Delays while the new manager becomes situated.
Human Error	Project / Artefact	Human Error causes bugs and wasted development time.
Demotivation	Project / Artefact	Demotivated developers are more likely to make mistakes and will be less productive.
Death	Project / Artefact / Business	If key people related to a project die it can be catastrophic.
Health Concerns	Project	General illness, pregnancy or anything that takes developers away from the project due to health.

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Risk	Type	Description
Overestimated Ability	Project / Artefact	Delays due to confusion and time spent gathering knowledge to complete allotted tasks.
Unavailability of Specialists and Contractors	Project / Business	Delays while waiting for external human resources to become available e.g. Graphic Artists.
Missed Deadlines	Project / Artefact	Missed deadlines can cause the project to be delayed or put more stress on the development team leading to an increase in errors.
Unforeseen Tasks	Project	Tasks that need to be completed for the project to be complete but were missed in the planning phase.
Disuse of Resources	Project / Business	When assets, human or otherwise, are idle and not being used on the project as effectively as they could be.
Artefact Unfit for Purpose	Artefact	Due to a mistake in the design and planning phases of the project the finished artefact is not fit for the customers purposes.
Missed Requirements	Artefact	Requirements that were missed during the project that the customer expected.
Final Costs Exceeding Estimates	Artefact	Final costs are far higher than anticipated.
Programming Errors	Artefact	Errors in the code that have an adverse effect on the final product.

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Risk	Type	Description
Unexpected Usage	Artefact	When a user uses the application in a way that was not anticipated and is not supported.
Broken Systems	Artefact	When broken systems within the artefact cause It to not function correctly.
Supporting Software Failure	Artefact	Third party libraries or systems fail or behave unexpectedly causing the artefact to malfunction.
Change of Operating Environment.	Artefact	The customer changes their operating environment.
Technology is Superseded	Business	Prior to the project being finished something else is released that is superior.
Competitor Launches Similar Product	Business	Competitor launches a similar product. Can cause the final costing and financial return estimates to become invalid.
Customer Looses Interest	Business	Part way through a project the customer decides they no longer want the product.
Dispute over IP	Business	When either the company or an outside party claims ownership of the intellectual property rights to the product and the company or an outside party infringes upon those rights.
Reduction in Project Budget	Business	Project budget is reduced. May lead to delays or fewer/lower quality resources.

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Risk	Type	Description
Natural Disaster	Project/Artefact/Business	May cause the loss of the entire project.
Bad Weather	Project	Bad weather could make transport to and from client or the SoHo office unviable.
Theft of Equipment	Project	Will result in a delay as replacement equipment is found.
Power Failure	Project	Whilst power is absent development will be impossible
Unexpected Staff Absence	Project	If a staff member is absent for a day on then it will delay the project by a day
Staff Family Illness	Project	If a staff member's spouse or child is ill it may result in the staff member being absent
Corporate Espionage	Business	Competitors may attempt to sabotage the project or gain insight into the systems that make up the artefact in order to give them a competitive advantage.

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6.2 Risk Assessment

Risk	Probability	Impact
Requirements Change	High	Moderate
Requirements Unmet	Low	Severe
Undocumented Requirements	Low	Severe
Insufficient Research	Moderate	Serious
Poorly Defined Requirements	Moderate	Serious
Delayed Specification	Moderate	Tolerable
Underestimated Scope	Low-Moderate	Moderate/Serious
Hardware Unavailability	Moderate-High	Tolerable
Asset Copyright	Low	Serious
Staff Turnover	Moderate	Moderate
Management Change	Low	Tolerable
Human Error	Near Certain	Tolerable
Demotivation	Moderate	Serious
Death	Low	Catastrophic
Health Concerns	High	Serious
Overestimated Ability	Low	Serious
Unavailability of Specialists and Contractors	Moderate	Tolerable/Serious
Missed Deadlines	High	Serious
Unforeseen Tasks	Low	Intolerable
Disuse of Resources	Moderate	Tolerable/Serious
Artefact Unfit for Purpose	Low	Catastrophic
Missed Requirements	Low	Severe/Catastrophic
Final Cost Exceeds Estimates	High	Tolerable
Programming Errors	High	Tolerable
Unexpected Usage	High	Moderate
Broken Systems	Low	Serious
Supporting Software Failure	Low	Severe
Change of Operating Environment	Low	Serious
Technology is Superseded	Low-Moderate	Catastrophic
Competitor Launches Similar Product	Low-Moderate	Severe-Catastrophic

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Risk	Type	Description
Customer Looses Interest	Low	Catastrophic
Dispute over IP	Low	Severe
Unforeseen Costs	Moderate-High	Intolerable
Reduction in Project Budge	Low	Catastrophic
Natural Disaster	Very Low	Catastrophic
Bad Weather	Low	Tolerable
Theft of Equipment	Very Low	Serious
Power Failure	Low	Tolerable
Staff Family Illness	Moderate	Severe
Corporate Espionage	Moderate	Severe-Catastrophic

6.3 Risk Avoidance Strategy

Risk	Strategy
Requirements Change	By being extremely thorough in the initial design we can minimize the chances that we miss out key requirements and ensure that the requirements that we do gather from the customer are concise and clear. To help mitigate any possible delays or damage this may cause the project it is imperative that the customer is kept aware of the project state as it develops. In this way we can catch issues earlier and save man-hours.
Requirements Unmet	
Undocumented Requirements	
Insufficient Research	
Poorly Defined Requirements	
Feature Creep	Feature creep will not be allowed. Proper planning and development structure will be enforced thereby avoiding this issue completely.
Hardware Unavailability	By putting in place level of service (LOS) agreements with technical support staff and taking proper measures to ensure our hardware receives regular maintenance and servicing we can keep hardware unavailability to a minimum.
Hardware Failure	It is impossible to completely protect against hardware failure but by keeping regular backups we can minimise data loss. IT will hold redundant hardware to help reduce the amount of disruption this causes.
Staff Turnover	This is unavoidable but we can mitigate it by taking steps to ensure our employees are happy. (e.g. Keeping reasonable work hours)

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Risk	**Strategy**
Management Change	If appropriate it would minimise the effect of a management change to have the new manager start working with the team before the current manager leaves. In this way the new manager could situate themselves while the current manager is still in place and then the new manager could take over seamlessly with very little disruption.
Human Error	Human error is completely unavoidable. But may be mitigated through providing training courses to the staff.
Death	Death is unlikely to be an issue in a project but it is also completely impossible to avoid.
Health Concerns	Impossible to avoid but may be mitigated by accounting for illness in the initial planning phase. If a staff member or their spouse or child is ill then recovery will be aided by the private medical insurance that all employees have.
Staff Family Illness	
Overestimated Ability	Should not be an issue with proper management of human resources.
Unexpected Usage	Proper testing of the software with controlled groups of testers (who are not developers themselves) will help to mitigate this issue.
Supporting Software Failure	We have no control over third party software but we can ensure that we only use mature stable software in our projects.
Change of Operating Environment.	We can avoid this issue by making our project completely platform neutral. But often this isn't a possibility and we will only be able to mitigate this by properly researching the customer and making sure we support their operating environment and their future plans.
Technology is Superseded	There is no way of avoiding this without stooping to corporate espionage.
Dispute over IP	By taking the proper legal action to gain complete or partial ownership of the IP prior to starting the project we can avoid this issue.
Natural Disaster	We can avoid loss of data from natural disasters by keeping off-site backups.
Bad Weather	Impossible to avoid however in the case of it affecting a client visit the monetary cost will be covered by travel insurance.

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Risk	**Strategy**
Theft of Equipment	The office has been secured by unique key cards for all employees and 24 hour security guards. To reduce the effect of loss IT holds redundant workstations.
Power Failure	This is unavoidable without huge expense however it will cause only a minor interruption.
Corporate Espionage	By keeping the project work area secure and carefully selecting who gains access we can stop most attempts at corporate espionage but we can further reduce this risk by training our employees to recognise social engineering attempts.

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Software Quality Plan

7 Introduction

7.1 Purpose

The purpose of this software quality plan is to define the standards to which the language and roles project will be developed which will enable SegFault Software to make Language & Roles a high quality project.

7.2 Scope

This document will assure that: (1) Language & Roles is a fully functioning and robust application; (2) the program suits the client's needs; (3) documentation is of a high standard; (4) the development process cycle itself is high quality with all components acting in a professional manner.

8 Applicability

This document will be used throughout the: analysis, design, implementation, testing and evaluation of Language & Roles. This SQP is in effect until all deliverables including the L&R program, documentation, installation, presentation and 2 years of phone support have been delivered to the client in their entirety.

This plan applies only to software developed by SegFault Software. Products and services provided by third parties may not abide by the same quality standards.

9 Applicable Documents

Microsoft UI Guidelines:
http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=2695

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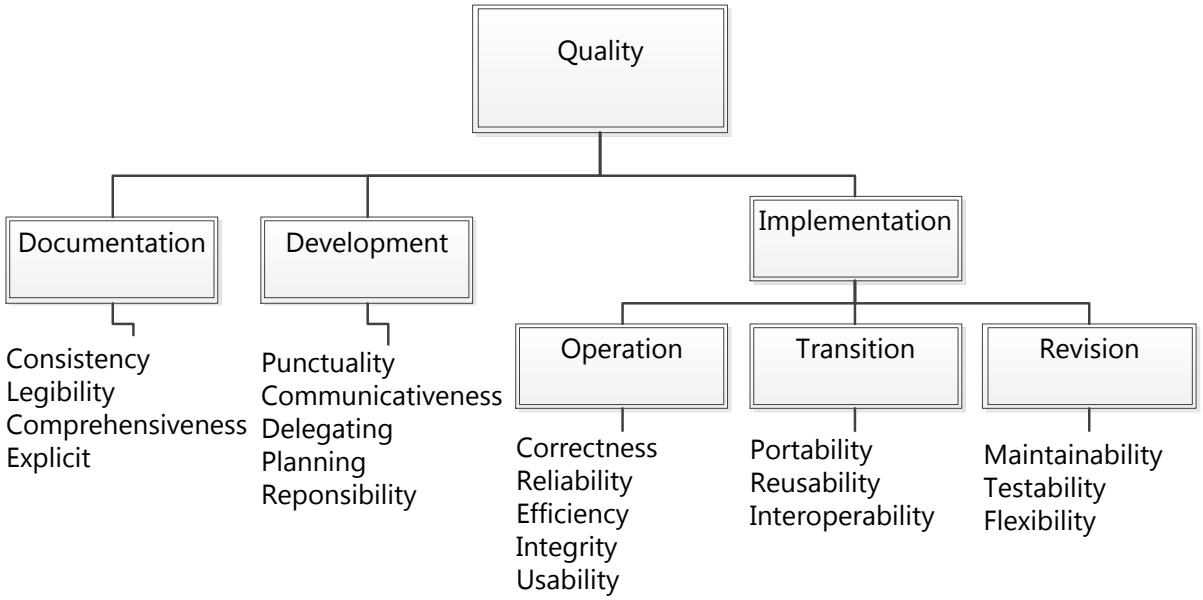
10 Document Structure



Quality can be broken down into several categories; this plan is structured according to this breakdown.

- Documentation – These apply just to the documentation used to support the program
- Development – These standards apply to the development process itself
- Implementation – These standards apply to the L&R program
    - Operation – Refers to the way the program functions
    - Transition – Refers to the ability to move parts of the program and interface it with other programs
    - Revision – Refers to the ease of supporting and modifying the program

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11 Documentation

Standard Number	**Category**	**Definition**	**Time of Implementation**
DO1	Consistency	All documents must show consistent facts and figures	Throughout
DO2	Legibility	All documents must be written in British English	Throughout
DO3	Legibility	All documentation must use proper grammar and spelling	Throughout
DO4	Consistency	All documents must use Segoe UI font	Throughout
DO5	Consistency	The default font size for all documents is 11	Throughout
DO6	Comprehensiveness	All documents must be include all sections used by reputable established companies	Start of each document
DO7	Explicit	All documents should contain a list of definitions for any terms not in common use	Throughout
DO8	Explicit	Unnecessary technical terminology should be avoided	Throughout

12 Development

Standard Number	Category	Definition	Time of Implementation
DE1	Punctuality	All team members should attend all meetings	Throughout
DE2	Punctuality / Communicativeness	Emails should be read and responded to within 24 hours	Throughout
DE3	Planning	A plan that covers the entire project must be made to schedule tasks	Beginning of project
DE4	Planning	The plan must be adjusted throughout the development cycle so that it consistently reflects reality	Throughout
DE5	Delegating	Skills matrices must be completed by all team	Beginning of project

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		members to allow tasks to be delegated properly	
DE6	Responsibility	Each team member is responsible for making sure their work is compliant with all quality standards	Throughout
DE7	Communication	Each member must communicate either by email or in person that they have started a piece of work to prevent duplication	Throughout

13 Implementation

Standard Number	Category	Definition	Time of Implementation
I1	Correctness	The program must match the: specification that the client provided, the software requirements specification and the conceptual and technical designs	Implementation
I2	Correctness	Each test in the test plan must correspond with a point in the technical design	Testing
I3	Reliability	Results, tests and configuration data must be transmitted over the network accurately	Implementation
I4	Reliability	Results must be accurate to at least the nearest whole number	Implementation
I5	Reliability	Graph data must be accurate to at least 3 decimal places	Implementation
I6	Efficiency	Distribution of new results over the network will take at most 5 seconds per client over a 100mb/s TCP/IP network	Implementation
I7	Efficiency	Distribution of new questions and answers will take a maximum 1 second per client per question/answer pair over a	Implementation

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		100mb/s TCP/IP network	
I8	Efficiency	Distribution of new configuration options will take at most 5 seconds per client over a 100mb/s TCP/IP network	Implementation
I9	Integrity	It must be impossible to use the software without logging in	Design
I10	Integrity	Only teachers and system administrators will be able to access results and configuration data	Design
I11	Usability	The UI of the pupil section of the software must not use language that does not comply with a British reading age of 4	Design
I12	Efficiency	The program, not including the questions and answers, must not use more than 100mb of backing store space	Implementation
I13	Correctness	The program must run on the client's systems	Implementation
I14	Usability	The GUI must meet the Windows User Interface Guidelines (29/09/2010)	Design
I15	Integrity	The program must not introduce security flaws into the school's IT system	Design / Implementation
I16	Portability	The software must not require any configuration to install on the client's computer	Implementation
I17	Portability / Integrity	It must be possible to fully remove the program including all files	Implementation
I18	Maintainability	GUI objects will use a suitable standardised prefix for the object type followed by an underscore and then an appropriate variable name	Design

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Standard Number	Category	Definition	Time of Implementation
I19	Maintainability	All code blocks will be indented by exactly one tab	Implementation
I20	Maintainability	Only one statement will occur per line	Implementation
I21	Maintainability	Left hand comparisons shall be used *i.e. 42==a not a==42*	Implementation
I22	Testability / Flexibility / Maintainability / Interoperability	The configuration data will be stored in a separate readable file from the executable	Design
I23	Testability / Flexibility / Maintainability / Interoperability	Questions and answers will be stored in a separate file from the executable	Design
I24	Flexibility / Reusability	Class names will be named with semantic names in upper camel case ie FileInputOutput	Implementation
I25	Flexibility / Reusability	Class names will not use acronyms unless it is more commonly used than its unabbreviated counterpart	Implementation
I26	Flexibility / Reusability	Variable names will be semantic and in lower camel case with the first word written in lower case and subsequent words beginning with a capital letter i.e. numberOfCars	Implementation
I27	Maintainability / Flexibility	Variables with single character names should not be used unless scope is confined to a single code block i.e. I, j, k	Implementation

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Standard Number	Category	Definition	Time of Implementation
I28	Flexibility / Reusability	Method names will have semantic lower camel case names similar to variable names with the first word written in lower case and subsequent words beginning with a capital letter i.e. getNumberOfCars	Implementation
I29	Flexibility / Reusability	All names used within the code will fully follow standard British English language including all grammar and punctuation	Implementation
I30	Maintainability / Testability	Version control will use the .NET convention of: major version, minor version, revision number and build number i.e. 1.0.5.20042	Implementation
I31	Reliability	The program must be fully tested in compliance with IEEE 829-2008	

14 Software Quality Assurance Plan

15 Introduction

15.1 Purpose

The purpose of this software quality assurance plan is to define the techniques and methodologies which will enable SegFault Software to enforce the standards required to make L&R a high quality product. The format of this document follows the requirements of L&R's Software Quality Plan .

15.2 Scope

This document will assure that: (1) Language & Roles is a fully functioning and robust application; (2) the program suits the client's needs; (3) documentation is of a high standard; (4) the development process cycle itself is high quality with all components acting in a professional manner.

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16 Applicability

This document will be used throughout the: analysis, design, implementation, testing and evaluation of Language & Roles. This SQA is in effect until all deliverables including the L&R program, documentation, installation, presentation and 2 years of phone support have been delivered to the client in their entirety.

This plan applies only to software developed by SegFault Software. Products and services provided by third parties may not abide by the same quality standards.

17 Applicable Documents

Template used: http://acis.mit.edu/acis/sqap/

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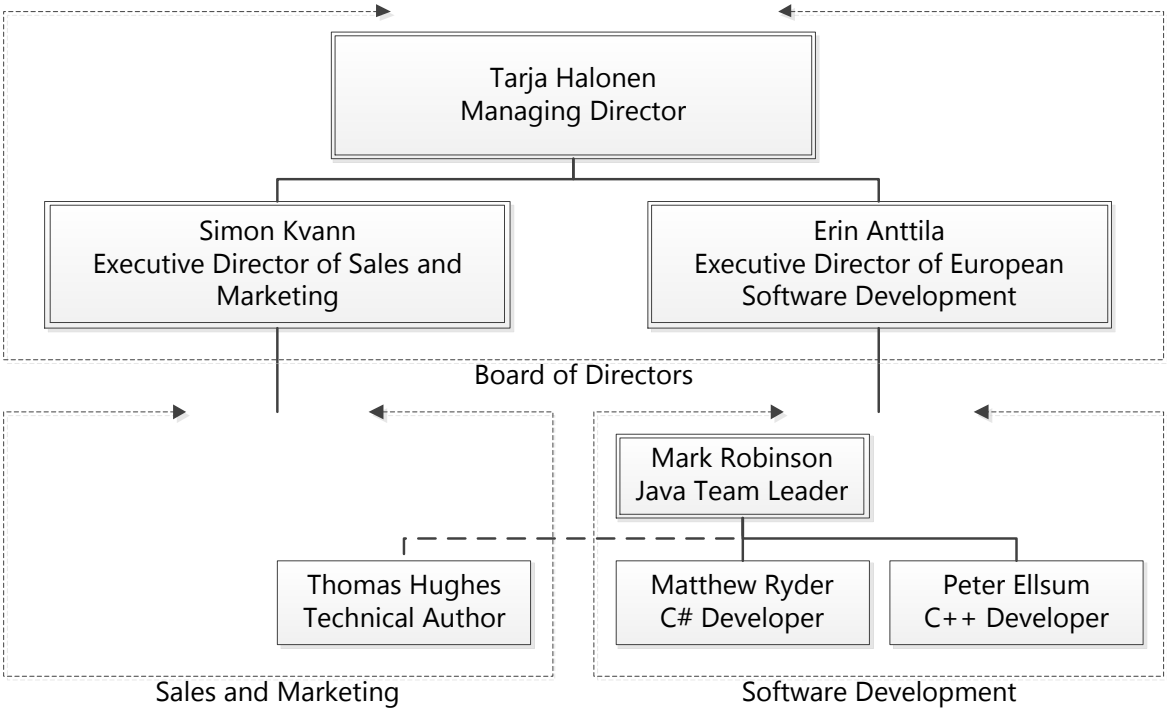
18 Project Management and Planning

18.1 Organisation



The L&R Project Team consists of 4 team members, 3 software developers and 1 technical author. All these members have been put under the direct management of Mark Robinson, a Java development team leader, for the development of this project. Mark acts as the point of contact for the client and reports directly to the Erin Anttila, Executive Director of European Software Development. Mark is acting software producer for this project and so is responsible for the overall project and managing contact with any other departments as required.

18.2 Tasks

All tasks related to the development of the software including all documentation will be managed and completed by the L&RPT. Administration tasks such as accounting and payment processing will be handled by the appropriate departments. Interfacing with these other departments will be the responsibility of Mark Robinson.

18.3 SQA Personnel

18.3.1 SQA Training

No additional training is expected to be required as all staff members are already sufficiently trained to deliver a quality product. In the case of new staff being

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recruited or contractors hired it will be ensured that they have the necessary qualifications and that they become familiar with this SQA.

18.3.2 Quality Software Developer - Training Certification

Every developer in the project team has already been assessed and provided QSD Certification by SegFault Software prior to joining the project team. This assessment is repeated annually to ensure compliance.

19 Program Requirements

19.1 Program Performance and Resource Allocation Monitoring

This will be included in the usability testing as exceeding latency limits may not make the program a technical failure however will make it difficult to use in practice.

19.2 SQA Program Audits

SQA will review and approve all design documents prior to development to ensure that the proposed system fits the client's needs and SegFault Software's quality standards. This will include L&R but not any third part dependencies, though dependencies shall be checked for adequate compatibility with the client's computer systems.

19.2.1 Scheduled Audits

Audits will occur at the end of each development phase before delivery and at each stage of testing the software.

19.2.2 Unscheduled Audits

Unscheduled SQA audits will occur both at random and when issues arise to ensure constant compliance.

19.2.3 Audits of the SQA Organisation

Audits of those responsible for the SQA will be completed by SegFault Software's Internal Audit department at random and on completion of each phase before delivery. This will ensure that the project team's SQA has been effective; results shall be delivered to the Executive Director of European Software Development and archived by the Internal Audit department.

19.2.4 Audit Reports

Audit reports contain the current status of the project, its quality level and recommended corrective actions. These reports shall be delivered to the project team and the corrective actions will be brought to the attention of the member of the team responsible for that section of the project.

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19.3 SQA Records

Audit reports will be held by both the project team and the Internal Audit department. Change and meeting logs shall be kept by just the project team and will be transferred to Internal Audit on the date of delivery of the software deliverables.

19.4 SQA Status Reports

SQA status reports will include the current quality of the project, the current progress of the project and a summary of any SQA audits accomplished since the last status report. These reports will be delivered directly to the Executive Director of European Software Development and archived by the Internal Audit department.

19.5 Software Documentation

SQA will review all documentation including those about L&R and those about the development process itself.

The essential documentation includes:

- Software Requirements Specification
- Costing Analysis
- Risk Analysis
- Quality Assurance Standards and Plan
- Conceptual Design
- Technical Design (UML, data storage,)
- Test Plan
- Testing
- Project Evaluation
- Client Presentation

Software documentation must be based on well-established standards or templates.

Documents will be audited to ensure they comply with the standards and templates used. Corrective recommendations will be issued if they do not comply which will be routed to the team member responsible. Documentation audits will be held by the project team and then transferred to Internal Audit for archiving.

19.6 Requirements Traceability

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SQA will audit requirements traceability via a spread sheet matrix to ensure all requirements are met at each stage of the development cycle. This will tie requirements from the SRS to lower level designs and tests of the resulting program.

19.7 Software Development Process

SQA will audit deliverables between each phase of the software development lifecycle. This will not preclude any other audits from being carried out.

19.8 Project Reviews

19.8.1 Formal Reviews

All deliverables must be submitted for formal review at latest the day before they are to be delivered. Any deliverable revision submitted after this time will not be formally reviewed and so will not be delivered to the client. During formal review any discrepancies will result in modification without consultation however corrective recommendations will be sent to the team member responsible post-delivery to assist in increasing the quality of future projects.

19.8.2 Informal Reviews

19.8.2.1 Design Walk-throughs

SQA will be invited to any and all design walkthroughs to help ensure that the design complies with: the quality standards of the project, the software requirements specification and ensures the design process is of a high quality.

19.8.2.2 Code Walk-throughs

SQA will be invited to any and all code walkthroughs to help ensure that the code complies with: the quality standards of the project, software requirements specification and ensure that the code is peer reviewed.

19.9 Tools and Techniques

SQA will assure that the quality of all program critical components does not affect the quality of L&R. This includes third party libraries, frameworks and compilers. Case tools and tools used to create documentation need not be controlled.

19.10 Software Configuration Management

Software configuration management is the management of the progression of the software's definition from general concept to strict technical requirements. This ensures that all stages are client focussed and that there are no discrepancies between documents from different stages.

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This will take the form of change logs and the policy that when a document is altered all dependents must be checked for consistency. Consistency shall also be checked as part of the formal audit at the end of a development phase.

19.11 Release Procedures

Internal version control will use the .NET convention of: major version, minor version, revision number and build number i.e. 1.0.5.20042. This number will be removed prior to delivery to the client

External version control are identified by the number after the title, the first version will not have a number.

19.12 Change Control

Change control will be managed using Git which whilst it has not been audited by SQA it is well established as a quality product.

When a release is sent to someone outside of the development team for testing purposes it will be sent with a short version description which will describe the scope of the current version, any known faults and the version number of the software.

19.13 Problem Reporting

Any problems will be reported to the lead programmer and must include the test number that corresponds with what the user was doing, a description of the problem and the version number of the software. A copy of all problems reported will also be kept by SQA and transferred to Internal Audit on delivery of software deliverables for archiving.

19.14 Software Testing

19.14.1 Unit Test

Unit tests are necessary to ensure that each individual class functions properly these will be carried out by the lead programmer due to the fact it is a form of white box testing and therefore requires intimate knowledge of the code.

19.14.2 Suitability Testing

Suitability testing will make sure that the functionality of the program fits the initial spec received from the client and the software requirements specification. It will be the responsibility of SQA to test this and cannot involve any team member which has programmed the software.

19.14.3 Usability Testing

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Usability testing will check that L&R is usable by young children and non-IT professionals. It will be the responsibility of the project manager to arrange these tests with an entity external to the entire project.

19.14.4 Integration Testing

This will be the last round of testing to occur and will ensure that L&R will run on the client's systems. This will be conducted by the programming and software installation team.

20 Appendixes

20.1 Software Licence Agreement

SOFTWARE LICENSE AGREEMENT

This Software License Agreement ("Agreement") is made as of February 24, 2012 (the "Effective Date") between SegFault Software, an individual with an address at 25 Golden Square, London, Greater London W1F 9LS ("Party-1"), and Hilton's Academy for the Morally Upright ("Party-2").

This Agreement describes Party-2's purchase of Services and Deliverables from Party-1.

Party-1 and Party-2 therefore agree as follows:

1. DEFINITIONS.

(a) "*Deliverables*" means the deliverables Party-1 provides to Party-2 as described in this Agreement.

(b) "*Government Authority*" means any governmental authority or court, tribunal, agency, department, commission, arbitrator, board, bureau, or instrumentality of the United States of America or any other country or territory, or domestic or foreign state, prefecture, province, commonwealth, city, county, municipality, territory, protectorate or possession.

(c) "*Law*" means all laws, statutes, ordinances, codes, regulations and other pronouncements having the effect of law of any Government Authority.

(d) "*Services*" means the services Party-1 provides to Party-2 as described in this Agreement.

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(e) "*Software Deliverables*" means the software described in this Agreement.

2. SERVICES. Party-1 agrees to provide the following Services: analysis of your needs by SegFault analysts, phone support for 2 years after the product has been delivered, initial installation and configuration of Language and Roles software

3. DELIVERABLES. Including the Software Deliverables described below, Party-1 agrees to provide the following Deliverables: Language and Roles, 1 (one) print copy of all documentation, 1 (one) digital copy of all documentation in PDF format

4. SOFTWARE DELIVERABLES.

(a) License Grant. Party-1 grants Party-2 a perpetual, non-exclusive, non-transferable, and non-sublicenseable license to use the Software Deliverables for Party-2's internal business purposes. This license survives the Agreement, but may be terminated in the same way described in the provision entitled "Termination for Breach" in this Agreement. This license may only be exercised in the following territory: United Kingdom

(b) License Type. All Party-2 employees may exercise the Software Deliverables license.

(c) Location. Subject to any license grant requirements, Party-2 may install and use the Software Deliverables on any computer system(s) or central processing unit(s) selected by Party-2 from time to time.

(d) Copies. Party-2 may make one (1) copy of each of the Software Deliverables for testing, backup or archival purposes and not for production use. In making copies of the Software Deliverables, Party-2 may not remove any copyright or other proprietary rights notices contained in or placed upon the Software Deliverables by Party-1.

(e) Restrictions. Party-2 may not (except if expressly authorized to do so elsewhere in this Agreement): (a) reproduce, publicly display, publicly perform, distribute, or create derivative works from the Software Deliverables; (b) provide third parties with access to the Software Deliverables under a service bureau, time sharing, or other arrangement; or (c) reverse engineer, decompile, disassemble, or otherwise attempt to derive or access any of the Software Deliverables' source code and/or human readable embodiment.

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5. ESCROW. "Escrow Agent" means the third party escrow agent mutually agreed to by the parties in writing.

(a) Escrow Agreement. The parties agree to select an Escrow Agent. Party-1 must keep the escrow updated to reflect the version of the Software Deliverables used by Party-2. The parties further agree to select and execute one of the Escrow Agent's escrow agreements that the Escrow Agent makes generally available to its escrow customers. The escrow agreement must contain the following release conditions:

(i) Support Failure. If Party-1 fails to perform its warranty, maintenance or support contractual obligations after receipt of notice and at least thirty (30) days to cure such failure;

(ii) Insolvency. If Party-1 becomes bankrupt or insolvent;

(b) Escrow Items. Party-1 agrees to place in escrow for Party-2:

(i) Source Code. At least one (1) copy of the source code for the Software Deliverables on a computer-readable magnetic medium and a human-readable listing of such source code;

(ii) Documentation. Two (2) copies of the documentation that Party-1 ordinarily provides to licensees of the Software Deliverables; and

(iii) Technical Documentation. Technical documentation, program specifications, and any other documentation necessary to enable a reasonably skilled computer programmer to modify, customize, and create derivative works based on the Software Deliverables.

(c) Escrow Release Usage. Party-2 may reproduce and prepare derivative works of any source code released from escrow and otherwise use such source code to maintain the Software Deliverables, limited to allowing Party-2 to exercise its license to the Deliverables under this Agreement.

6. DEADLINE. The Services and Deliverables will be provided by April 26, 2012

7. OWNERSHIP, TITLE AND RISK OF LOSS. Ownership of, title to, and risk of loss for the Deliverables passes to Party-2 upon Party-2's receipt at its designated facility for

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delivery. However, ownership, title and risk of loss for the Software Deliverables applies to the copy only and does not extend to the intellectual property and other proprietary rights in the Software Deliverables. Additionally, if any Software Deliverables are downloaded, ownership of, title to, and risk of loss passes to Party-2 upon Party-2's complete download of the Software Deliverables.

8. FEES. Except as expressly stated in this Agreement, there are no additional fees, charges or expenses incurred. In consideration for Party-1 performing all obligations under this Agreement, Party-2 agrees to pay Party-1 a flat fee of: 4995 GBP Party-1 shall invoice Party-2 for the entire overall flat fee in this Agreement on the date the Deliverables are received by Party-2. Party-2 agrees to reimburse Party-1 for travel, materials and supplies and other reasonable out-of-pocket expenses incurred under this Agreement if: (a) Party-2 pre-approves the expenses in writing; and (b) Party-1 Personnel submit receipts and other appropriate documentation substantiating the expenses, including an itemized expense statement included with Party-1's invoice.

9. INVOICES AND TAXES. Party-2 agrees to pay to Party-1 all fees owed under this Agreement within thirty (30) days after the date of Party-2's receipt of a complete invoice. A complete invoice is one that contains the invoice number, invoice date, description of the transaction, total invoice amount with miscellaneous charges listed separately and payment terms consistent with and not additional to any provisions under this Agreement. To the extent that the transactions under this Agreement are subject to any sales, use, value added or any other taxes, payment of these taxes, if any, is Party-2's responsibility. Party-1 is liable for any and all taxes on any and all income it receives under this Agreement.

10. WARRANTIES.

(a) Mutual Warranties. Each party represents, warrants and covenants to the other that:

(i) General. It: (a) is a company duly organized and validly existing and in good standing under the Laws of its jurisdiction of organization; (b) is qualified or licensed to do business and in good standing in every jurisdiction where qualification or licensing is required; and (c) has the corporate power and authority to negotiate, execute, deliver and perform its obligations under this Agreement.

(ii) Law Compliance. It complies with all applicable Laws.

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(b) Warranties by Party-2. Party-2 represents, warrants and covenants to Party-1 that:

(i) Warranty Length. For a period of thirty (30) days after receipt, the Services and Deliverables conform to the requirements of this Agreement, are free from any defect in material and workmanship, and are free of all liens, claims and encumbrances of any kind.

(ii) Infringement. The Services and Deliverables do not violate any patent, trade secret, or other intellectual property or proprietary rights of any third party, and as of the Effective Date.

(iii) No Litigation. There is no actual or threatened litigation: (a) that affects its ability to comply with this Agreement, or (b) concerning the Services or Deliverables.

(iv) Services Performance. The Services are performed in a professional and competent manner, conforming to generally accepted standards applicable to services provided by nationally recognized firms specializing in the area of Services provided under this Agreement. Each of the individuals assigned to provide any Services under this Agreement have the proper skill, training, and background to provide the Services.

(c) Disclaimer. EXCEPT AS EXPRESSLY STATED IN THIS AGREEMENT, PARTY-1 AND PARTY-2 EACH MAKE NO REPRESENTATIONS AND EXTEND NO WARRANTIES OR COVENANTS OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

11. LIMITATION OF LIABILITY. THIS LIMITATION OF LIABILITY PROVISION APPLIES IN THE AGGREGATE AND NOT ON A PER CLAIM BASIS, WHETHER ANY DAMAGES ARE CHARACTERIZED IN TORT, NEGLIGENCE, CONTRACT, OR OTHER THEORY OF LIABILITY, REGARDLESS OF WHETHER A PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF OR COULD HAVE FORESEEN ANY DAMAGES, AND IRRESPECTIVE OF ANY FAILURE OF ESSENTIAL PURPOSE OF A LIMITED REMEDY. THIS LIMITATION OF LIABILITY PROVISION DOES NOT LIMIT A PARTY'S LIABILITY FOR GROSS NEGLIGENCE, INDEMNIFICATION OBLIGATIONS, BREACH OF CONFIDENTIALITY REQUIREMENTS, INTENTIONAL MISCONDUCT, INTENTIONAL TORTS AND INTENTIONAL VIOLATIONS OF LAW. NEITHER PARTY IS LIABLE TO THE OTHER OR ANY THIRD PARTY UNDER THIS AGREEMENT FOR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR RESULTING FROM THIS AGREEMENT. EACH PARTY'S LIABILITY SHALL NOT EXCEED THE AMOUNTS PAID, DUE

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AND PAYABLE UNDER THIS AGREEMENT.

12. INDEMNIFICATION. The term "*Claim*" means any claim, suit or action by any third party, and the term "*Losses*" means any damages awarded and fines assessed in any Claim by a court of competent jurisdiction or pursuant to an arbitration proceeding, any amounts due under Claim settlement, and any other costs or expenses incurred in complying with any injunctive or equitable relief or any settlement requirements.

(a) Party Indemnification.

(ii) Indemnification by Party-2. Upon receipt of notice from Party-1 requesting Party-2 to do so, Party-2 agrees to indemnify, defend, and hold harmless Party-1 and its affiliates, subsidiaries, shareholders, members, directors, officers, employees, agents, and parents, from and against any Claim, and any associated Losses to the extent caused by: (a) violation of any patent, copyright, trademark, trade secret, or other intellectual property or proprietary right to the extent caused by Party-2's internally created specifications or Party-2's use of the Services or Deliverables; (b) bodily illness and injury, death, tangible property damage and theft, to the extent caused by Party-2's negligent or wilful acts or omissions; or (c) Party-2's breach of this Agreement.

(b) Indemnification Procedures. The term "indemnifying party" means the party assuming indemnification obligations under this Agreement, and the term "indemnified party" means all parties, including any third parties, which the indemnifying party agrees to indemnify under this Agreement.

(i) Notice. The indemnified party must give the indemnifying party prompt written notice of a Claim, provided, however, that failure of an indemnified party to give prompt written notice does not relieve the indemnifying party from its indemnification obligations under this Agreement except to the extent the defence is materially prejudiced by the failure. When the indemnifying party receives notice of a Claim from an indemnified party, the indemnifying party agrees, at its sole cost and expense, to assume the defence of the Claim by representatives chosen by the indemnifying party. The indemnified party may participate in the defence of the Claim and employ counsel at its own expense to assist in the defence of the Claim, subject to the indemnifying party retaining final authority and control over the conduct of the defence.

(ii) Conduct of Defence. The indemnifying party's defence attorneys must be

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reasonably experienced and qualified in the areas of litigation applicable to the defence. The indemnifying party has the right to assert any defences, causes of action or counterclaims arising from the subject of the Claim available to the indemnified party and also has the right to settle the Claim, subject to the indemnified party's prior written consent to the extent the settlement affects the rights or obligations of the indemnified party. The indemnified party agrees to provide the indemnifying party with reasonable assistance, at the indemnifying party's expense, as may be reasonably requested by the indemnifying party in connection with any defence, including, without limitation, providing the indemnifying party with information, documents, records and reasonable access to the indemnified party as the indemnifying party reasonably deems necessary.

13. TERM AND TERMINATION.

(a) Term. The term of this Agreement (together with any renewals, the "Term") begins on the Effective Date and expires 2 years later. Any renewal term shall be mutually agreed to by the parties in writing.

(b) Survival. The following captioned sections survive any termination, expiration or non-renewal of this Agreement: "Disclaimer", "Limitation of Liability", "Indemnification", "Survival" and "General", as well as any other provisions expressly stating that they are perpetual or survive this Agreement.

(c) Termination for Insolvency. If either party is adjudged insolvent or bankrupt, or upon the institution of any proceedings by it seeking relief, reorganization or arrangement under any Laws relating to insolvency, or if an involuntary petition in bankruptcy is filed against a party and the petition is not discharged within sixty (60) days after filing, or upon any assignment for the benefit of a party's creditors, or upon the appointment of a receiver, liquidator or trustee of any of a party's assets, or upon the liquidation, dissolution or winding up of its business (each, an "Event of Bankruptcy"), then the party affected by any Event of Bankruptcy must immediately give notice of the Event of Bankruptcy to the other party, and the other party may terminate this Agreement by notice to the affected party.

(d) Termination for Breach. If either party breaches any provision contained in this Agreement, and the breach is not cured within thirty (30) days after the breaching party receives notice of the breach from the non-breaching party, the non-breaching party may then deliver a second notice to the breaching party immediately terminating

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this Agreement.

14. FORCE MAJEURE. Any failure or delay by a party in the performance of its obligations under this Agreement is not a default or breach of the Agreement or a ground for termination under this Agreement to the extent the failure or delay is due to elements of nature or acts of God, acts of war, terrorism, riots, revolutions, or strikes or other factor beyond the reasonable control of a party (each, a "Force Majeure Event"). The party failing or delaying due to a Force Majeure Event agrees to give notice to the other party which describes the Force Majeure Event and includes a good faith estimate as to the impact of the Force Majeure Event upon its responsibilities under this Agreement, including, but not limited to, any scheduling changes. However, should any failure to perform or delay in performance due to a Force Majeure Event last longer than thirty (30) days, or should three (3) Force Majeure Events apply to the performance of a party during any calendar year, the party not subject to the Force Majeure Event may terminate this Agreement by notice to the party subject to the Force Majeure Event.

15. GENERAL. Entire Agreement and Amendments. This Agreement is the entire agreement between the parties and supersedes all earlier and simultaneous agreements regarding the subject matter, including, without limitation, any invoices, business forms, purchase orders, proposals or quotations. This Agreement may be amended only in a written document, signed by both parties. Independent Contractors, Third Party Beneficiaries, and Subcontractors. The parties acknowledge that they are independent contractors under this Agreement, and except if expressly stated otherwise, none of the parties, nor any of their employees or agents, has the power or authority to bind or obligate another party. Except if expressly stated, no third party is a beneficiary of this Agreement. Both parties are free to subcontract their obligations under this Agreement. Each party is responsible for its subcontractors' compliance with and breach of this Agreement as if the subcontractors' acts and omissions were the party's own. Governing Law and Forum. All claims regarding this Agreement are governed by and construed in accordance with the Laws of England, applicable to contracts wholly made and performed in such jurisdiction, except for any choice or conflict of Law principles, and must be litigated in the United Kingdom, regardless of the inconvenience of the forum, except that a party may seek temporary injunctive relief in any venue of its choosing. The parties acknowledge and agree that the United Nations Convention on Contracts for the International Sale of Goods is specifically excluded from application to this Agreement. Assignment. This Agreement binds and inures to the benefit of the parties' successors and assigns. This Agreement is not assignable, delegable, sublicenseable or otherwise transferable by either party in whole

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or in part without the prior written consent of the other party. Any transfer, assignment, delegation or sublicense by a party without the other party's prior written consent is invalid. No Waivers, Cumulative Remedies. A party's failure to insist upon strict performance of any provision of this Agreement is not a waiver of any of its rights under this Agreement. Except if expressly stated otherwise, all remedies under this Agreement, at Law or in equity, are cumulative and nonexclusive. Severability. If any portion of this Agreement is held to be unenforceable, the unenforceable portion must be construed as nearly as possible to reflect the original intent of the parties, the remaining portions remain in full force and effect, and the unenforceable portion remains enforceable in all other contexts and jurisdictions. Notices. All notices, including notices of address changes, under this Agreement must be sent by registered or certified mail or by overnight commercial delivery to the address set forth in this Agreement by each party. Captions and Plural Terms. All captions are for purposes of convenience only and are not to be used in interpretation or enforcement of this Agreement. Terms defined in the singular have the same meaning in the plural and vice versa.

IN WITNESS WHEREOF, the parties execute this Agreement as of the Effective Date. Each person who signs this Agreement below represents that such person is fully authorized to sign this Agreement on behalf of the applicable party.

PARTY-1

By: _____
Print Name: _____
Title: _____

PARTY-2

By: _____
Print Name: _____
Title: _____

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21 Market Research

Before we start to plan our game we thought it would be a good idea to see what features the competition are planning to implement into their programmes so we can ensure ours is the most likely to sell. We also decided to ask parents and teachers what they would like to see in a game.

21.1 Competition

Game Type	Features
Mathematics problems	Colourful graphics and helpful on screen visual aids to assist the child in completing various maths problems. The faster the child answers the questions the higher their score will be which is stored onto a leader board along with other pupils scores.
Jigsaw puzzles	Various jigsaw puzzles which vary in skill levels, using the mouse to move and rotate jigsaw pieces. The child will start at an easy level but as they progress through the game they will unlock increasingly difficult puzzles. A help system can be used three times per puzzle which will show the pupil where to put a random piece.
Cat maze	Colourful maze game which centres on a cat trying to get to his dinner through a series of increasingly complex mazes. Before the game starts a small cinematic will be shown showing the cat run towards the screen. Colourful graphics are included as well as a challenge mode in which the player must get to the goal in a set time.
Matching pairs	A card game in which the pupil must find and match two identical cards. Initially starting with just a few cards the game will progressively include more and more until a full deck is being displayed. Different difficulties can be selected to change the amount of cards or set a time limit in which to find all of them. A multiplayer aspect to the game is implemented in which two pupils take it in turns to find as many pairs as possible.

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Game Type	Features
Wildlife memory game	A picture of colourful cartoon wildlife will appear on the screen, then after a set amount of time this will disappear and return with one of the characters missing, this image will disappear and the pupil is then given a selection of animals to select which one was missing from the second picture. Different difficulty modes are available which will increase the amount of animals on screen as well as decrease the time given before the images disappear.
Musical memory game	Cartoon characters will play a specific beat on screen which the pupil is then tasked to repeat in a "Simon says" type of game. After each successful repetition the pupil is awarded a point, however the beat will get longer. The score each pupil gets will be stored onto a leader board so that pupils can be in competition with each other. The game will incorporate musical files corresponding to the appropriate on screen instrument played.

21.2 Teachers

After researching into the competition we decided to go straight to the parents and teachers to ask what they would like to see in an educational game as in the end these would be the customers buying our game. Here is a list of the most required features.

- Bright and colourful
- Multiplayer capabilities to allow two or more pupils to play the game together
- High score leader boards
- Education elements ranging from simple questions to complex puzzles
- Friendly cartoon characters
- Hints and tips on how to solve the on screen problem or puzzle
- Musical output
- Animations
- Rewards for completing various tasks such as achievements

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22 Skills Matrices

Skill level		Description
0	None	No experience
1	Awareness	Has some experience however may struggle to produce a functional piece of work without assistance
2	User	Can usually produce a functional piece of work however it may lack optimization or good formatting
3	Expert	Able to work that is appropriate to the client's needs and of a high quality

Thomas Hughes	Technical Author
h005481a@student.staffs.ac.uk	

Skill	None	Awareness	User	Expert	Comments
Programming					
C/C++		1			
Java			2		
VB/C#.Net	0 - VB		2 – C#		
Programming fundamentals			2		
Good programming practices			2		
Algorithm optimisation			2		
Visual Studio			2		
NetBeans			2		
Eclipse	0				
Databases					
Embedding SQL in applications		1			
SQL			2		
Access			2		
MySQL			2		
SQLite	0				
Web					
HTML		1			
PHP	0				
ASP/ASP.Net	0				
JavaScript	0				
Silverlight	0				
Dreamweaver		1			
Apanta	0				

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Skill	None	Awareness	User	Expert	Comments
Expression Studio	0				
SEO	0				
IIS	0				
Apache	0				
Technical software design					
Database design			2		
UI design				3	
UML			2		
JSP		1			
Flowcharts				3	
Testing					
Unit tests			2		
Test plan			2		
Documentation					
Analysis documentation				3	
User documentation				3	
Maintenance documentation				3	
Project evaluation				3	
Misc					
Microsoft Word				3	
Microsoft Visio			2		
Photoshop		1			

Mark Robinson	Java Team Leader
r006709a@student.staffs.ac.uk	

Skill	None	Awareness	User	Expert	Comments
Programming					
C/C++			2		
Java				3	
VB/C#.Net			2 - both		
Programming fundamentals				3	
Good programming practices				3	
Algorithm optimisation			2		
Visual Studio				3	
NetBeans				3	
Eclipse	0				
Databases					

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Skill	None	Awareness	User	Expert	Comments
Embedding SQL in applications		1			
SQL				3	
Access			2		
MySQL	0				
SQLite	0				
Web					
HTML			2		
PHP	0				
ASP/ASP.Net		1			
JavaScript	0				
Silverlight	0				
Dreamweaver	0				
Apanta	0				
Expression Studio	0				
SEO	0				
IIS	0				
Apache	0				
Technical software design					
Database design			2		
UI design			2		
UML				3	
JSP				3	
Flowcharts			2		
Testing					
Unit tests			2		
Test plan			2		
Documentation					
Analysis documentation			2		
User documentation			2		
Maintenance documentation			2		
Project evaluation		1			
Misc					
Microsoft Word				3	
Microsoft Visio				3	
Photoshop		1			

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Matthew Ryder	C# Developer
r004581a@student.staffs.ac.uk	

Skill	None	Awareness	User	Expert	Comments
Programming					
C/C++			2		
Java			2		
VB/C#.Net		VB – 1		C# - 3	One of my best languages would be C#.
Programming fundamentals				3	
Good programming practices				3	
Algorithm optimisation			2		
Visual Studio				3	
NetBeans			2		
Eclipse		1			
Databases					
Embedding SQL in applications		1			
SQL			2		
Access			2		
MySQL			2		
SQLite	0				
Web					
HTML				3	
PHP				3	Strong history with PHP, more than apt with the language.
ASP/ASP.Net		1			
JavaScript			2		
Silverlight	0				
Dreamweaver				3	
Apanta	0				
Expression Studio	0				
SEO	0				
IIS	0				
Apache		1			
Technical software design					
Database design			2		
UI design				3	

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Skill	None	Awareness	User	Expert	Comments
UML				3	
JSP	0				
Flowcharts		1			
Testing					
Unit tests			2		
Test plan				3	
Documentation					
Analysis documentation			2		
User documentation				3	
Maintenance documentation			2		
Project evaluation			2		
Misc					
Microsoft Word				3	
Microsoft Visio			2		
Photoshop				3	

Peter Ellsum	C++ Developer
ew000559@student.staffs.ac.uk	

Skill	None	Awareness	User	Expert	Comments
Programming					
C/C++				3	I'm familiar with C++. I use it quite a lot.
Java			2		I know the language itself fairly well but I hate the IO library.
VB/C#.Net			VB – 2	C# - 3	I've used C# about as much as Java but I prefer the .NET/Mono libraries to the Java ones. VB.Net I have used but C# has more or less replaced it for me.
Programming fundamentals				3	

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Good programming practices			2		I have a bad habit of reaching for advanced features to the detriment of good practice.
Algorithm optimisation		1			I'm aware of algorithmic efficiency and how to achieve it but it's never come up.
Visual Studio			2		Visual studio is a great IDE. But I'm a user. I'm not familiar with the plugin API or anything that advanced to be an expert.
NetBeans			2		
Eclipse				3	I've written plugins for eclipse. I use it a lot for android development.
Databases					
Embedding SQL in applications		1			
SQL			2		
Access		1			I have used access before.
MySQL			2		
SQLite	0				
Web					
HTML		1			
PHP		1			
ASP/ASP.Net				3	C# with a web wrapper. More than capable with ASP.NET
JavaScript		1			
Silverlight	0				

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Dreamweaver			2		
Apanta	0				
Expression Studio	0				
SEO	0				
IIS	0				
Apache			2		
Technical software design					
Database design			2		
UI design				3	
UML			2		
JSP	0				
Flowcharts			2		
Testing					
Unit tests				3	
Test plan			2		
Documentation					
Analysis documentation			2		
User documentation			2		
Maintenance documentation			2		
Project evaluation			2		
Misc					
Microsoft Word				3	
Microsoft Visio			2		
Photoshop				3	I do a fair amount of texture work.

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