TESIS^ APPROVAL STATUS FORM

JUDUL: **JAVA MOBILE GAME APPLICATION**

SESI PENGAJIAN: **2004/ 2005**

Saya **LAW MENG YIN**
(HURUF BESAR)

mengaku membenarkan tesis (PSM/Sarjana/Doktor Falsafah) ini disimpan di Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dengan syarat-syarat kegunaan seperti berikut:

1. Tesis adalah hakmilik Kolej Universiti Teknikal Kebangsaan Malaysia.
2. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. ** Sila tandakan (/)

_____	SULIT	(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)
___/___	TERHAD	(Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)
_____	TIDAK TERHAD	

(TANDATANGAN PENULIS) (TANDATANGAN PENYELIA)

Alamat tetap :
276,Kg. Karak, 28600 Pahang.

Azah Kamilah binti Muda
Nama Penyelia

Tarikh :1 October 2004 Tarikh : 1 October 2004

CATATAN: ** Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa.
^ Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM)

JAVA MOBILE GAME APPLICATION

LAW MENG YIN

This report is submitted in partial fulfillment of the requirements for the
Bachelor of Information and Communication Technology
(Software Development)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
2004

ADMISSION

I admitted that this project title name of

JAVA MOBILE GAME APPLICATION

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : _____ Date : 19/10/04

(LAW MENG YIN)

SUPERVISOR : _____ Date : 19/10/04

(AZAH KAMILAH BINTI MUDA)

DEDICATION

To my beloved parents...

ACKNOWLEDGEMENTS

The first on my list of appreciation would be my supervisor, Miss Azah Kamilah binti Muda. She has provided a motivating, enthusiastic, and critical atmosphere during the many discussions we had. She also provided me with incredible support, encouragement and guidance in both the writing of this thesis and the work which preceded it. It was a great pleasure to me to conduct this thesis under her supervision.

Thousands of thanks I would like to express to Mr. Karl Hornell, Mr. Mohd Sanusi bin Azmi and Mr. Ahmad Naim bin Che Pee @ Che Hanapi for always guiding me. They gave me supportive suggestions and comments to improve my thesis.

I would like to extend my sincere gratitude and appreciation those who willing to become my tester during testing phase. Without your cooperation, I won't able to complete my thesis successfully.

Last but not least, I would like to extend my warm thank those who are not mention in here but have directly or indirectly helping and guiding me towards completing my thesis; your efforts and time are much appreciated.

Finally, to all my family members and friends that have given me moral support, a million thanks. Without all of them that I have mentioned, I would not be able to undergo my thesis successfully and meaningfully. All the experiences and knowledge that I have gained are their efforts and time spent.

ABSTRACT

Java mobile game application called Cheezer is a J2ME game application. Current console games not longer satisfy mobile phone user's requirements for quality games since the device manufacturers offer colour screen mobile phone. So, this project aims to build a colourful downloadable mobile game application to fulfill mobile game market request. Its significances are to improve current console games, fulfill mobile phone user's need for quality games and provide entertainment value to mobile phone user for short time periods. The Waterfall model for SDLC has been chosen as project methodology because its deliverables of every stage match the milestone requirement. Multiple techniques such as fact-finding, modeling and prototyping are applied during project development. Scope of this project is to develop a Java standalone client mobile game application, which has one stage, but display random maze for each new game. This game application offers attractive sprites, animation and audio effect. Score will be accumulated during user plays the game. Bonus will be added to score if user is able to finish the game within duration. It is also able to save the high score and provide simple instructions. As conclusion, it aims to become accessible to user no matter nationality, culture, age and sex at anywhere and anytime. Its goal to merge Java application with latest mobile technology, enhance current console games, as entertainment resource and gain revenue through selling the application.

ABSTRAK

Aplikasi permainan mudah alih Java, Cheezer adalah aplikasi permainan J2ME. Permainan telefon bimbit yang berwarna hitam putih kini tidak dapat memenuhi kehendak pengguna untuk permainan berkualiti sejak pekilang memperkenalkan telefon bimbit berskrin berwarna-warni. Oleh yang demikian, projek ini adalah untuk membina satu aplikasi permainan telefon bimbit yang berwarna-warni dan dapat dimuat-turun untuk memenuhi kehendak pasaran sekarang. Kepentingan projek ini adalah untuk memperbaiki permainan telefon bimbit yang berwarna hitam putih iaitu membekal permainan berkualiti, berwarna, mempunyai nilai hiburan untuk pengguna dalam masa yang singkat. Model air terjun untuk *SDLC* telah dipilih sebagai metodologi projek sebab hasil kerja bagi setiap peringkat dapat memenuhi kehendak '*milestone*'. Pelbagai teknik seperti pencarian fakta, permodelan dan ptototaip telah digunakan semasa pembangunan aplikasi. Skop projek ini adalah untuk membangunkan satu aplikasi permainan telefon bimbit klien Java yang mempunyai satu peringkat sahaja, tetapi memaparkan susunan permukaan yang berbeza. Permainan ini dapat memaparkan '*sprite*', animasi dan kesan audio yang menarik. Markah akan dikumpulkan semasa pengguna bermain permainan ini. Di samping itu, bonus akan ditambahkan kepada markah apabila pengguna dapat menghabiskan permainan dalam jangkamasa yang ditetapkan. Ia juga dapat menyimpan rekod markah tertinggi dan membekal penunjuk. Kesimpulannya, permainan ini berhasrat agar dapat dicapai oleh pengguna bila-bila masa dan di mana sahaja tidak kira kewarganegaraan, budaya, umur dan jantina. Maklamat permainan ini adalah untuk menggabungkan aplikasi Java dengan teknologi mudah alih terbaru serta memperbaiki permainan telefon bimbit yang berwarna hitam putih sekarang.

TABLE OF CONTENTS

CHAPTER VII TESTING

CHAPTER VIII PROJECT CONCLUSION

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

2.5G	-	2.5 Generation
2D	-	2 Dimension
3D	-	3 Dimension
3G	-	third generation
API	-	Application Programming Interface
BREW	-	Binary Runtime Environment for Wireless
CASE	-	Computer Aid System Engineering
CDC	-	Connected Device Configuration
CD-ROM	-	Compact Disc- Read Only Memory
CGI	-	Common Gateway Interface
cHTML	-	compact HTML
CLDC	-	Connected Limited Device Configuration
CORBA	-	Common Object Request Broker Architecture
CPU	-	Central Processing Unit
EDGE	-	Enhanced Data Rate for GSM Evolution
EE	-	Enterprise Edition
EPOC	-	Mobile device operating system offered by Symbian company
EQ	-	Emotional Quotient
ERD	-	Entity Relationship Diagram
etc	-	et cetera
FPS	-	First-Person Shooter
GC	-	Garbage Collector
Gif	-	Graphics interchange format
GPI	-	General Platform Interface
GPRS	-	General Packet Radio Services

GPS	-	Global Positioning System
GSM	-	Global Service Networks
HDML	-	Handheld Device Markup Language
HTML	-	Hypertext Markup Language
HTTP	-	Hypertext Transfer Protocol
ID	-	identity
IDE	-	Integrated Development Environment
IDSA	-	Interactive Digital Software Association
IP	-	Internet Protocol
IR	-	Infra-Red
ISP	-	Internet Service Provider
J2ME	-	Java 2 Platform Micro Edition
JAD	-	Java Descriptor file
JAR	-	Java Archive file
JAVAC	-	Java compiler
JNI	-	Java Native Interface
JPEG	-	JPEG file interchange format
kbps	-	kilo bits per second
KVM	-	K Virtual Machine
LAN	-	Local Area Networks
MB	-	Mega Bits
Mbps	-	million bits per second
MIDI	-	Musical Instrument Data Interface
MIDP	-	Mobile Information Device Profile
MMS	-	Multimedia Message Service
OOA	-	Object-oriented analysis
OOD	-	Object-oriented design
OOP	-	Object-oriented programming
OS	-	Operating System
OTA	-	over the air
PC	-	Personal Computer
PDA	-	Personal Device Assistant
PERT	-	Program Evaluation and Review Technique

PHP	-	Personal Homepage
PIM	-	Personal Information Management
PNG	-	Portable Network Graphic
PSM I	-	*Projek Sarjana Muda I*
PSM II	-	*Projek Sarjana Muda II*
RAD	-	Rapid Application Development
RAM	-	Random Access Memory
RMI	-	Remote Method Invocation
RPG	-	Role Playing Game
SDK	-	Software Development Kit
SDLC	-	System Development Life Cycle
SE	-	Standard Edition
sim	-	simulator
SMS	-	Short Message Service
ST	-	System Testing
swf	-	Flash executable file
TDMA	-	Time Division Multiple Access
Tech	-	Technology
U.S.	-	United States
UAT	-	User Acceptance Testing
UI	-	User Interface
UML	-	Unified Modeling Language
URL	-	Universal Relative Locator
USB	-	Universal Serial Bus
UT	-	Unit Testing
WAP	-	Wireless Application Protocol
wav	-	Wave sound file
WBS	-	work breakdown structure
WML	-	Wireless Markup Language
XHTML	-	Extensible HTML

LIST OF APPENDICES

CHAPTER I

INTRODUCTION

1.1 Preamble/Overview

This chapter gives an overall introduction of the project. It describes the overview of project, problem statements, objective, scopes, contributions and the expected outcome of the project.

Java mobile game application--Cheezer is a J2ME (Java 2 Platform Micro Edition) game application. Almost public nowadays owns a mobile phone and the mobile phones mostly support Java Technology. But console games not longer satisfy mobile phone user's requirements for quality games since the device manufacturers offer colour screen mobile phone. So, this project aims to build a colourful downloadable mobile game application to fulfill mobile game market request.

Device manufacturers, telecommunication service provider and mobile commerce service provider are eyeing on this mobile game market. For example, device manufacturer such as Nokia offers N-Gage model with excellent game functionality to attract buyers. Some telecommunication service providers such as Maxis and Digi provide downloadable mobile game to boost their popularity and attract more consumers to use their services. For example, Maxis offers a series of UEFA mobile game applications. Mobile commerce service provider such as www.iguanamobile.com.my seeks it as a chance to gain more revenue.

There are some major constraints of this project, which encountered by mobile phone are: the limited processing power and memory of these devices, the limitations in input/ output mechanisms, these devices depends on batteries on power, these devices have very limited display capability in terms of area, resolution and so on.

Java is clearly one of the platforms of choice for mobile devices to overcome such constraints, and an ideal language for throwing together mobile games. The virtual machine contained in J2ME is naturally optimized for the devices with small memory capability. The Mobile Information Device Profile (MIDP) of J2ME, which is a subset of the standard Java, allows developers to handle mobile-device-specific issues, such as creating user interfaces, allowing local storage and defining the lifecycle of MIDP client applications (MIDlets). Several brands of Java phones offer neat extension APIs that help to access special, native features. Motorola, Siemens, and Nokia, for example, have game APIs (Application Program Interface) that allow for audio, animations, sprites, tiled backgrounds, transparency, and better graphics.

The Waterfall model for System Development Life Cycle (SDLC) has been chosen as project methodology because its deliverables of every stage match the milestone requirement. Multiple techniques such as fact-finding, modeling and prototyping will be applied during project development.

1.2 Problem Statement

Currently device manufacturers offer mobile phones with colour screen. However, there are a few colour mobile games in the market. Current console games are not longer satisfy mobile user for quality games because colour mobile games offers more attractive features such as animation and interface. As a solution, this Java mobile game application is developed to fulfill mobile user's need for quality game and improve current console games.

1.3 Objective

Objectives of Java mobile game application development are:

- To merge Java game application with latest mobile phone technology since the mobile phone hardware and technology is rapidly advancing
- To become an enhancement to current console embedded mobile game
- To improve Emotional Quotient (EQ) of mobile phone user by release tension through playing mobile game
- To make the mobile game application to become a positive entertainment activity

1.4 Scope

Scope of this project is to develop a Java standalone client mobile game application, which has one stage, but offer random maze for each new game. Score will be accumulated during user plays the game. Time left will be added to score as bonus if user can finish the game within game duration. This game application offers attractive sprites, animation and audio effect. It is also able to save the record of high score. It will provide simple instructions to guide the user too.

Functionality of the game application is listed as below:

a) start a new game
b) view the instructions
c) continue to play game
d) pause a game
e) save and view the high score
f) quit the game

This game application aims to be accessible to anyone—anywhere, anytime. It target users not only teenagers, but also adult and children. This means its game design will consider such factors as nationality and culture, age, sex and so on.

This games application is designed for single player. It only can be installed by mobile phone devices, which support minimum requirement to run MIDlet. A colour screen Java-enabled mobile phone is a must to put the game application in operation. It is currently unable to be downloaded through GPRS or EDGE because a WAP-enabled website is needed to support this service. So, the mobile phones need to have USB personal computer connectivity support to complete installation process.

Aspects to be considered in this project include how to create Portable Network Graphic (PNG) for images of sprites, program the MIDlet as game application, apply PNG file and audio file into MIDlet, package the program into

JAR file, test the application in emulator, launch the application into mobile phone and so on.

1.5 Contributions

This project is significant to merge Java game application with latest mobile phone technology. It improves and evolves current console mobile game into colourful game application.

It also fulfills mobile phone user's need for quality games because it offers game APIs (Application Program Interface) that allow for audio, animations, sprites, tiled backgrounds, transparency, and better graphics.

It plays important role to entertain mobile phone user while he has small chunks of free time available between tasks. It provides entertainment value for short time periods and allows users to switch smoothly between game and work modes.

1.6 Expected Output

The expected outcome for this project will be a downloadable Java mobile game that offers attractive audio effect, animations, sprites, tiled backgrounds and better graphics. The functions provided include start a new game, pause a game, continue a game, save and display the high score, display instructions and quit the game.

Below are the function descriptions:

- Start a new game function: enable user to play a game, provide a random maze for each new game and display game board.
- Pause a game: save the score accumulated and last screen before pause.
- Continue a game: enable user to continue plays his paused game.
- Save and display the high score: high score record is saved automatically and displayed to user when user request or game is over.
- Display instructions: simple instructions about how to play the game are provided to user.
- Quit: user can quit the game anytime as he wish.

1.7 Summary

This chapter gives an overall introduction of the project. It describes the overview, problem statements, objective, scopes, contributions and expected output.

This project's goal is to develop a mobile game application for colour screen mobile phone. It aims to become accessible to user no matter nationality, culture, age and sex at anywhere and anytime since mobile phones have become integral part of publics. It offers interactive and attractive animation, graphic and audio effect.

Its objectives include merge Java application with latest mobile technology, enhance current console games and as entertainment resource.

Scope of this project is to develop a Java standalone client mobile game application, which has one stage, but display random maze for each new game. This game application offers attractive sprites, animation and audio effect. Score will be accumulated during user plays the game. Bonus will be added to score if user is able to finish the game within duration. It is also able to save the high score and provide simple instructions.

Its significances are able to improve current console games, fulfill mobile phone user's need for quality games, provide entertainment value to mobile phone user for short time periods and become a strong competition in the entertainment industry.

The contributions of this project are to fulfill mobile user's need for quality game and improve current console game. The expected output for this project is a downloadable Java mobile game application that offers attractive audio effect, animations, sprites, tiled backgrounds and better graphics.