Unity RPG Hack and Slash Game

4th Year Project

By

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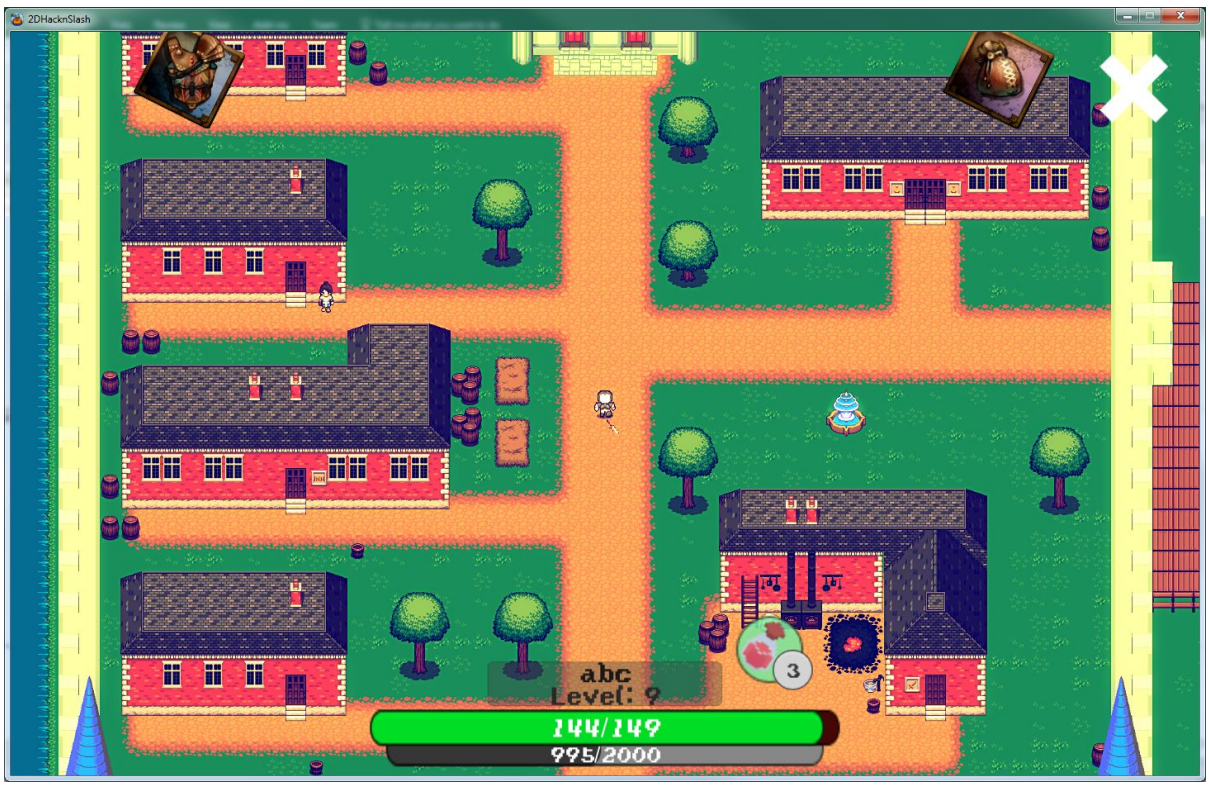


Table Of Contents

Project Research **2**
- Detailed Discussion 2
- Existing Applications in this domain 3
- Platform, Technologies and Libraries 4
  - Platform 4
  - Technologies 4
  - Libraries 4
- The Risks 5

Technical Architecture **6**
- Software Components 6
- Platform Libraries 7
- Distribution and Deployment 8
- Risks 8

Prototypes **9**

Use Cases **9**

Iteration Logs **11**
- Iteration #1 11
- Iteration #2 12
- Iteration #3 13
- Iteration #4 14
- Iteration #5 15
- Iteration #6 16

Test Report **18**
- Summary 18
- Test 1 18
- Test 2 20
- Test 3 22
- Test 4 23
- Test 5 24

Project Research

Detailed Discussion

The idea proposed is a Hack and Slash Adventure Video Game which will have many features like combat, multiplayer, RPG elements, 2D pixel art style, both developer designed and procedurally generated levels and stores all user progress despite playing on Android or PC.

This will provide a coherent and fun user experience, it will be easy to learn how to play, connecting with other players for multiplayer will be simple and quick. The player will be able to create their character to fit their playstyle yet still be well balanced while playing solo or multiplayer.

Having researched multiple Hack and Slash video games I understand that the user should not be too overburdened with information, this will be achieved with a minimalistic heads up display and simple to understand sprites with well defined animations.

The player will have many different levels to explore with different enemies and bosses to encounter acquiring loot which makes their character adapt in ways the player sees fit while progressing through the game by leveling up which will unlock more areas to explore and tougher enemies to fight.

The goal for this project is for both hardcore and casual gamers to enjoy it as the android market is more casual oriented than the more hardcore PC audience. Mobile players should be able to pick up and play while PC players can have long gaming sessions.

Existing Applications in this domain

There are multiple video games that are hack and slash for both Android and PC but I want to create a similar game but with other elements to make it different.

Similar Games	Similarities	Differences
Torchlight 1/2	• RPG Elements • Combat • Multiplayer	• No Cross-Platform • All levels procedurally generated • 3D instead of 2D
Gods War II	• Similar style and tone • RPG Elements	• No Cross-Platform • No Multiplayer
Albion Online	• Cross-Platform • RPG Elements • Combat • Multiplayer	• Different Art Style • Has crafting mechanics

Platform, Technologies and Libraries

- **Platform**

The Android Platform has a large market share of casual users and is more developer friendly than ios this makes it both a good choice for practical reasons such as larger customer base and easier development

Windows PC is a large platform for hardcore and casual games since the advent of digital distribution with sites like steam, this makes PC a core part of the gaming market with many mobile games porting themselves to PC to reach a more hardcore audience.

- **Technologies**

The Unity game engine will be the project's main technology, it provides a high quality engine that's easy to use providing the developer with many assets such as libraries servers and a code repository.

The game will be programmed in C# and the database will be created using SQL and hosted with Apache. I'll use image editing software Photoshop to create and edit images to make art assets for the game.

- **Libraries**

I plan to use the PHP library for all the user information storage in my game providing cross platform information to both Android and PC. The game itself will use Unity's scripting API with C#.

The Risks

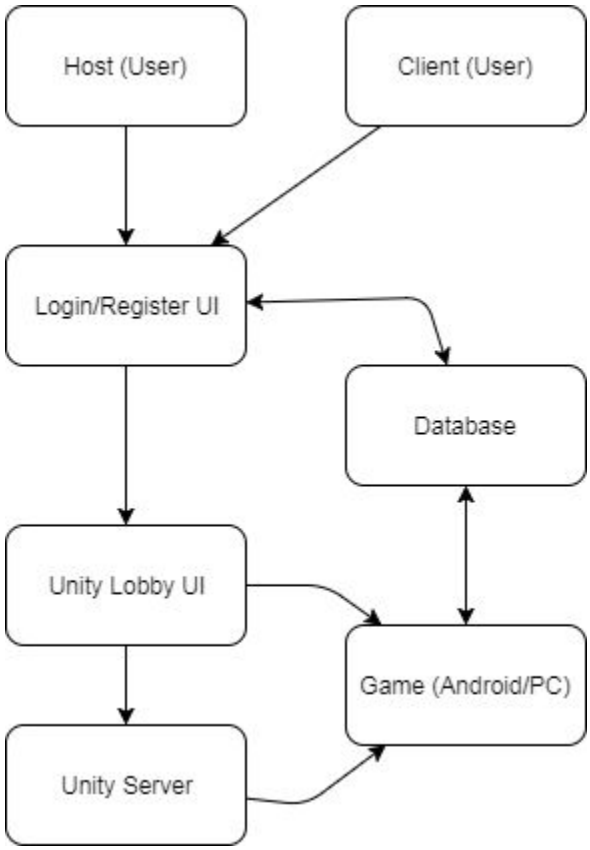
The biggest risk to the project is the seamless Multiplayer Cross-Platform gameplay as resources on this type of online player may be scarce with most developers segmenting their audience to the platform of choice. Both version must be similar in performance so as not to give one side a better advantage against the other.

Internet speed issues may also occur such as lag or packet loss this must be prevented at all cost to ensure the game is playable over the internet.

Time is also a huge risk as making a good game may is huge undertaking for one person taking years for even seasoned solo developers to make a single game that stands out in the market, having only done projects within a team this will be a different experience as I use unity for the first time trying to learn how to use it most effectively within the time constraint given.

Technical Architecture

Architecture Diagram



Software Components

Unity Engine

Unity uses a component based software architecture, which means that the whole game is structured from different components you make. One component can give behaviours to another component which is more efficient for game development as it does not need to use inheritance or polymorphism to accomplish simple tasks. Unity is also able to make the same code usable for different operating systems which means you can make a game and have it work on PC, Android etc.

Android

Android OS is a stack of software components divided into five sections and four layers which are Linux Kernel, Libraries, Android Runtime, Application Framework and Applications.The game will run on the Applications layer and use some of the Application Framework for resource management.

XAMPP

XAMPP manages the Apache web server in collaboration with PHPmyAdmin to host a online Database from my own home by just setting a static Ip on my computer and forwarding certain ports on the router the database can be accessed from any IP.

Platform Libraries

Unity High Level API

Used to add multiplayer capabilities to a unity game. Its built on lower level transport real-time communication later and handles common tasks that are required for multiplayer games.

C#

C# will be used on the Unity engine which is compatible with Android OS.

SQL

Queries will be written in SQL to register the user to the database and authenticate the user when he logs in and update the the database.

PHP

Is used to execute the SQL lines on the Apache web server.

Distribution and Deployment

1. The multiplayer server will be hosted by Unity Multiplayer which uses UDP based protocol, multi channel design that avoids head-of-line blocking issues, supports a variety of Quality of Service per channel and has a flexible network topology that supports peer-to-peer or client-server architecture.

2. With some simple obfuscation of code it can stop some cheaters from editing their game, also the login system will authenticate the user that is playing the game and in the event of a person cheating in game like manipulating items or health the account can be banned.

Risks

The risks are figuring out what can be stored in the SQL database other than login data as the server itself could handle it better by itself and making the SQL database pointless.

Another risk is not having enough time to figure out the unity engine and how to develop a multiplayer game at the same time is a big issue as it is traditionally not a one person job.

Prototypes

Prototype Deliverable for week 8

The “Login”, “Play” and “Movement” use cases are deliverable for week 8 and to test them I will run the application on my computer and my Android phone.

Prototype Deliverable for week 11

The “Join”, “Host” and “Inventory” use cases are deliverable for week 11 and to test them I will run the Unity Multiplayer server and the application on my computer and my Android phone.

Use Cases

1.1 Title (goal) : Log In
1.2 Primary Actor : User
1.3 Scope : Login system
1.4 Level : User Goal
1.5 (Story) : The User logs in and is authenticated to use the system.

2.1 Title (goal) : Play Game
2.2 Primary Actor : User
2.3 Scope : Game System
2.4 Level : User Goal
2.5 (Story) : The User clicks “Play” on the GUI which initiates the single player game.

3.1 Title (goal) : Join Game
3.2 Primary Actor : User

3.3 Scope : Multiplayer Network System

3.4 Level : User Goal

3.5 (Story) : The User joins a multiplayer game chosen from the GUI.

4.1 Title (goal) : Create Game

4.2 Primary Actor : User

4.3 Scope : Multiplayer Network System

4.4 Level : User Goal

4.5 (Story) : The User creates a multiplayer game from the GUI for others to join.

5.1 Title (goal) : Movement

5.2 Primary Actor : User

5.3 Scope : Game System

5.4 Level : User Goal

5.5 (Story) : The User moves his character after pressing the movement buttons.

6.1 Title (goal) : Interact with Inventory

6.2 Primary Actor : User

6.3 Scope : Game GUI System

6.4 Level : User Goal

6.5 (Story) : The User equips items and manages his inventory, after clicking the inventory button.

Iteration Logs

Iteration #1

Iteration #1	Feature
Date of milestone	09/12/2016
Features in scope	Join Game
Features implemented	Join Game
Features in deficit this Iteration	
Iteration Comments & Summary	Player is able to join game through lan and multiplayer.

Feature
09/12/2016
Create Game
Create Game
Player is able to create game through lan and multiplayer.

Feature
09/12/2016
Movement
Movement
Player can move in the world

Feature
09/12/2016
Login
Login
No login yet, google play might take longer to implement or make own database.

Iteration #2

Iteration #2	
Date of milestone	07/02/2016
Features in scope	Inventory
Features implemented	Inventory
Features in deficit this Iteration	
Iteration Comments & Summary	The inventory syncs with the database and each user gets to see his own inventory.

07/02/2016
Equipment/Items
Equipment/Items
Similar to Inventory just need to implement more different items.

07/02/2016
Login
Login
Different players can login.

07/02/2016
Gameplay
Gameplay
Was unable to develop more of the gameplay as it took some time to develop the database for the inventory.

Iteration #3

Iteration #3	
Date of milestone	05/03/2017
Features in scope	Gameplay
Features implemented	Gameplay
Features in deficit this Iteration	
Iteration Comments & Summary	Gameplay is progressing there can still be more done.

05/03/2017
Equiping Weapons
Equiping Weapons
The player can equip weapons in the inventory.

05/03/2017
Dropping Items
Dropping Items
Need to finish implementing enemies and have them drop things

05/03/2017
More Enemies
More Enemies
Need to implement some more enemies

Iteration #4

Iteration #4	
Date of milestone	22/03/2017
Features in scope	Dropping Items
Features implemented	Dropping Items
Features in deficit this Iteration	
Iteration Comments & Summary	Items are dropped by enemies randomly

22/03/2017
More Enemies
More Enemies
Started making more interesting enemies

22/03/2017
Sounds
Sounds
Need to make/find some sounds

22/03/2017
More Levels
More Levels
Need to implement more areas for players to explore

Iteration #5

Iteration #5	
Date of milestone	05/04/2017
Features in scope	Multiplayer Gameplay
Features implemented	Multiplayer Gameplay
Features in deficit this Iteration	
Iteration Comments & Summary	The Host and Joined player can see eachothers actions

05/04/2017
More Enemies
More Enemies
Working on more interesting enemies

05/04/2017
Sounds
Sounds
Working on sounds to be heard by all players

05/04/2017
More Levels
More Levels
More Levels are being implemented

Iteration #6

Iteration #6	
Date of milestone	23/04/2017
Features in scope	More Enemies And Bosses
Features implemented	More Enemies And Bosses
Features in deficit this Iteration	
Iteration Comments & Summary	More Enemies and Bosses were implemented

23/04/2017
Sounds
Sounds
Sounds can now be heard from the player and enemies and music

23/04/2017
More Levels
More Levels
3 New Areas added to explore with different enemies and bosses

23/04/2017
A Database Leaderboard
A Database Leaderboard
Leaderboard is implemented with whover has slain the most bosses is at the top

23/04/2017

Lobby/Menu

Lobby/Menu

After the login it now leads into a menu where you can create a lobby for other players to join and displays the leaderboard

23/04/2017

Skills

Skills

Did not implement more skills for the player to play around with as I wanted to make interesting skills but that would have taken some time.

23/04/2017

Health Management

Health Management

Added a limited heal that gets replenished at the respawn fountain, which allows players to heal during battle but at a cost.

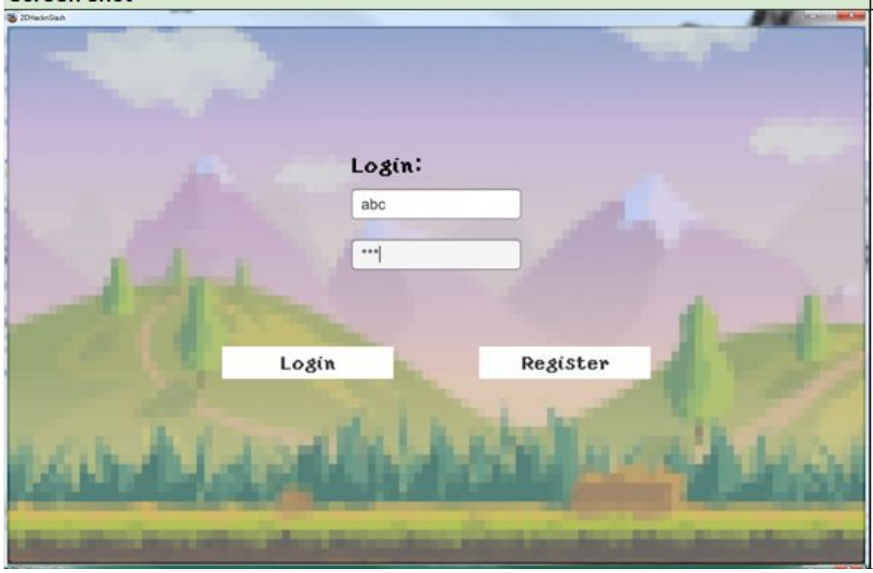
Test Report

Summary

Test Plan Summary	
%pass	100
%fail	0
# of tests performed	5

Test 1

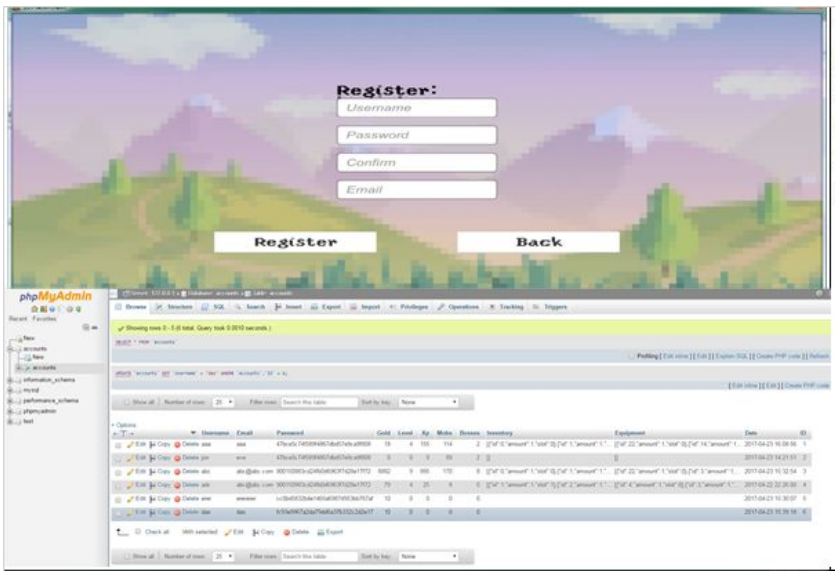
Test Plan Detail	
Test Type	**Test Objective**
Security Test	User can only log in with the correct username and password

Screen shot	Steps
	1. User Launches the game. 2. Types in his username and password 3. The game proceeds to the next menu if everything is correct 4. If something is incorrect it is displayed

Test data	Expected result	Pass/Fail?
Username: abc Password: abc	Next menu starts up	Pass

Test 2

Other	User registers a new account on the database.



1. User Launches the game.
2. Types in the correct details
3. User clicks register
4. If everything Is right and database is online the imputs are cleared and success text is displayed.

1. User Launches the game. 2. Types in the correct details 3. User clicks register 4. If everything Is right and database is online the imputs are cleared and success text is displayed.	Username: das Password: das Confirm: das Email: das

A new entry in the in the database appears with the users information	Pass

Test 3

Unit Test	User initiates an attack

1. User Clicks the attack button
2. If the user has a weapon equipped the attack initiates.

Attack button	User attacks	Pass

Test 4

Unit Test	User equips an item and it is updated in the databas

1. User Opens his inventory and equipment windows
2. User Drags an item onto a correct equipment slot
3. The updated equipment is synced with the online database

Item	Database updates	Pass

Test 5

Unit Test	User hits a loading barier and initiates a loading screen while he is taken to a new scene.

1. User Moves his player to an exit point
2. Loading screen starts
3. User starts in a new area

User	User is transported to a new area	Pass