Test Plan Template:

Pixel Wizard

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1.0 INTRODUCTION

Pixel Wizard is a 2d side scrolling platform game. In the game the user controls the main character. This character has basic game mechanics that will need to be tested, which are:

**PC**:

* Right arrow/D key to move forward
* Left arrow/A key to move backword
* Up arrow to jump
* Left mouse click/R for action
* C to crouch
* Spacebar to pause or resume the game

**Mobile:**

* Arrow on screen to move forward
* Arrow on screen to move backward
* Arrow on screen to jump
* Arrow on screen to crouch
* Button on screen for action
* Button on top right of screen to pause or resume the game

As well as the game mechanics each separate scene will have to be tested. The first scene is the main menu screen. This consists of 5 option for the player:

* Play game
* Settings
* Load game
* Delete game
* Exit game

**Play Game**

Play Game will bring the user to the first level of the game where all the mechanics and some assets will be tested

**settings**

Settings will load a scene where the user can change some of the settings of the game which will need to be tested for functionality these include:

* Adjust music level
* Adjust sound effects level

**Load Game**

Pressing the load game button will allow users to pick up where they last saved the game

**Exit game**

This button allows the user to exit without playing

The pause button (spacebar for PC, Button for mobile) will load another pause screen. The buttons on this screen will be:

* Save game
* Settings
* Exit game

**Exit and Settings**

Exit game and settings should load the same screen as they do in the main menu.

**Save Game**

The save game allows the user to load the game at any stage. This game should then be available in the load games option in the main menu.

**Game Complete Scene**

Game complete scene gives the user the option to either replay or exit the game.

**Game levels**

There are 3 levels of the game which increase in difficulty. All levels will have the same assets which include:

* Background image
* Player Character sprite
* Enemy character sprite
* Enemy and player fireball
* Ground
* Platform 1
* Platform 2
* Health
* Rock
* Menu logo

Not all of the assets will need to be tested. This will be discussed further in the document.

**2.0 OBJECTIVES AND TASKS**

**2.1 Objectives**

The main objectives of this test plan are as follows:

* to prevent bugs from happening in the game at as early a stage as possible.
* Sometimes it is not possible to prevent all bugs from happening in software. This means it is important to detect bugs at the earliest stage possible so that they are not carried through every production stage.
* To ensure user enjoyment by reducing bugs
* Software quality will be maintained by keeping bugs at a low level
* Identify testing standards and procedures that will be used on the project
* Used to define how test cases and documentation are written
* Document regression testing guidelines
* Define an exit strategy for testing
* Define the procedure to be undertaken when bugs are found
* Define the measurements that will determine if the test document is successful
* Ensure all tests are repeatable

**2.2 Tasks**

The main tasks of this test plan are as follows:

* Identify all software features that will be tested
* Identify items not to be tested
* Identify participants
* Create a testing strategy for the game
  + Define the documentation for unit testing
  + Define the documentation for system and integration testing
  + Define the documentation for stress testing
  + Define the documentation for user acceptance testing
  + Define the documentation for regression testing
  + Define the documentation for beta testing
* Create a test schedule for the game
* Create documentation on how to report problems
* Create documentation for change requests
* Create a measurement for success
* Create an exit strategy for all testing methods

**3.0 SCOPE**

**General**

This document underlines the steps to be taken to ensure that Pixel wizard is suitably tested before release to the public. All test cases and other testing processes should be prepared in accordance with this document.

This test plan underlines how to test:

* Each separate asset used in the game
* All scripts
* All interaction between units
* Functionality
* User interface
* Response
* User enjoyment
* Lag time

**Tactics**

All assets will be tested using unit testing. This is how all scripts will be tested.

Interaction between units will be tested using system integration methods detailed below

Lag time for the game will be calculated with a stress test detailed below

Functionality, user interface. Response and user enjoyment will all be tested by beta testing the game before it is released to the market.

All participants will be given a copy of the test plan and a meeting will be held to discuss the document before testing commences. Daily scrums will be held to ensure that everyone is up to date and clear on their assigned task. A list of participants can be found below:

**Participants**

Philip Kelly- Test Team Lead and project Leader

Cherelle Kenny – Tester

Jacqueline Howard- Lead Developer

Martin Henry – Developer

Ricky Chung- Lead Quality Assurance (QA)

Eimear Hill- Quality Assurance (QA)

Saoirse Glynn- Front end Developer

**4.0 TESTING STRATEGY**

**4.1 Unit Testing**

**Definition:**

A unit test tests one small unit at a time. A unit is defined as the smallest testable part of the code and varies depending on language. Unit tests should be designed to determine that a particular piece of code does exactly what it is meant to do when it is meant to do it. It is done using the white box testing method i.ie the item is known to the tester as they choose the inputs and know the expected outputs. Unit testing is the first test to be carried out.

There are many benefits to unit testing including:

* Makes it easier to detect flaws when changing or rewriting code
* Makes code easier to reuse
* Writing the tests in advance makes the testing process faster in the long run
* Catching a defect at a lower level cost less to repair than if it is caught at a later stage of testing

**Participants:**

Unit testing is to be carried out by the Testers Philip Kelly and Cherelle Kenny.

**Methodology:**

Unit testing will be conducted using a testing framework using the same language that the game will be written in. The testing team will write the scripts for each unit test which test all the functions outlined below.

**Game Level**

A unit test will be written to test:

* Unit scrolling script
* Game audio script

**Playable Character**

A unit test will be written to test:

* Move forwards
* Move backwards
* Jump
* Crouch
* Attack/action
* Pause/resume
* Health script
* Player death script
* Player audio script

**Enemy Character**

A unit test will be written to test:

* Enemy movement pattern
* Enemy attack pattern
* Enemy health
* Enemy death script
* Enemy audio script

**Enemy/player Projectile**

A unit test will be written to test:

* Projectile movement
* Projectile damage

**Main Menu**

A unit test will be written to test:

* Play game button
* Setting button
* Load game button
* Delete game button
* Exit game button
* Intro music script

**Settings Menu**

A unit test will be written to test:

* Adjust music level script
* Adjust sound effects level script

**Pause resume menu**

A unit test will be written to test:

* Save game function
* Settings button
* Exit game button

**End Game Menu**

A unit test will be written to test:

* Replay game script
* Exit game script

These tests can be repeated for each level of the game

It would be recommended to use JIRA which is a software management tool. This will be used to define task for testing track progress and also for bug reporting.

**Exit Strategy**

Unit testing is complete when:

* All test cases have been ran
* No critical errors are left un-fixed
* All test logs have been signed off

4.2 **System and Integration Testing**

**Definition:**

Tests the interactions between separates units when they are integrated together. Tests should be written that detects defects that occur when separate components interact with each other and therefore is usually conducted on a complete system. It is also done after the individual components have been tested themselves. Each integration is tested as soon as it is added to the system until the system is complete.

Some of the benefits of system and integration testing include:

* Helps to detect bugs early
* The integration testing can be carried out during development
* Finds errors in the interface

**Participants:**

Integration testing to be carried out by the Quality Assurance Leader Ricky Chung and Lead Developer Jacqueline Howard.

**Methodology:**

Integration should only be carried out after unit testing has been completed. All components should be completed and integrated. All integration Tests should be signed off and set up.

The testers will create test cases that test all levels of integration and procedures.

Integration tests should be carried out on the following systems:

The interface between the player character and the enemy character. Do they interact the way they are meant to interact? Does the player health decrease as the enemy attacks? Does the enemy health decrease as the player attacks? Does the enemy character react as expected when the player character appears on the screen?

The interface between the main menu and the first level. Does the menu link to the level correctly? Does every element load when it needs to load?

The interface between the pause/resume menu and each level. Each level needs to be tested separately. Does the menu link to the levels correctly? Does the level change from play mode to pause mode correctly?

The interface between each level. Does the level change to the correct level? Does the level link to the next level correctly?

The interface between the final level and the complete scene. Does the final level link to the scene correctly?

The save game function should be checked to see if the data has reached the database correctly. Storage procedures can be checked.

System integration testing should be conducted each time a new module is added to the game.

The bottom up approach should be used. In this method drivers can be used to manage the test input and output which can be removed once the cluster is tested and combined with the next level.

**Exit Strategy:**

The next stage of testing can only begin when:

* All testing is successful
* All test cases are documented
* All major bugs are fixed
* The documentation is signed off and released

**4.3 Performance and Stress Testing**

**Definition:**

Performance testing sets the standards for the game. It is used to determine how the game will react under normal circumstances.

Stress testing determines how stable the system is under pressure. It tests how the system reacts to extreme loads and how it recovers from it. Stress testing is done to ensure that the game does not crash under extreme circumstances

Some of the benefits of stress testing include:

* Helps check the games performance under various circumstances
* Allows testers to monitor the game at time of failure
* Can check for data security issues and privacy issues during stress test

**Participants:**

Stress testing to be carried out by developer Martin Henry and front-end developer Saoirse Glynn.

Methodology:

The stress testing will be done by the developer. It Should be completed after at least one level is completely finalized. Co CPU or GPU testing tools need to be used as the game does not use much processing power.

Stress testing can be carried out by adding enemies to the scene in large numbers to see if this causes the game to lag or crash. All enemies added have to be fully functioning i.e. have the ability to walk and attack the playable character. This stress testing should be done on many different handheld devices with different specifications. This should also be done for the pc version on different operating systems.

**Exit Strategy**

The next stage of testing can only begin when:

* The Stress conditions for the game have been documented and signed off on

**4.4 User Acceptance Testing**

**Definition:**

While all the other tests have been created under the developer guidelines, User acceptance testing is used to evaluate the game in accordance the user’s guidelines. It is carried out in respect to the user’s needs. It is the last level of testing before a system is released publicly. Also known as alpha and beta testing

Some of the benefits of user acceptance testing include:

* Reduces the risks of bugs making it through to production
* Improves user experience
* Removes the chance of testing bias

**Participants:**

User acceptance testing will be led by project leader Philip Kenny with Front-end developer Saoirse Glynn and develop Martin Henry

**Methodology:**

User acceptance test should be carried out using a beta test. Before the beta test is carried out the game should first be reviewed under the following criteria:

* All components of the game are ready to be tested
* All documentation for end users is complete. This should include:
  + Set-up instructions
  + Installation instructions
  + How to play
  + How to uninstall
* Alpha testing/systems testing should already be undertaken
* The instruction on how to identify bugs, feedback and software used should be given to testers

Beta testing should be monitored by the team manager who chooses a user experience team. The team manager should also decide what reward or incentive should be given to the beta testers.

Beta testing should focus on the following areas:

* Functionality
* User interface
* Response
* User enjoyment

It is recommended the beta testing software ReQtest is used to document the bugs recorded to keep all reporting concise and consistent. All beta testers should be versed on how to use the beta testing software before the testing commences.

Between 10-20 beta testers should be used for testing. The test should cover as many devices as possible to give a good range of testing coverage. Installation packages should be delivered to the testers before product launch.

One test cycle should be completed that lasts four weeks.

All bugs reported by should be sent to the developers to be fixed.

All feedback should be sent to the test leader for evaluation. Feedback should be analysed under the above criteria.

**The exit criteria for beta testing:**

* Game breaking bugs should no longer be documented on any device or platform.
* Any major bugs that have been reported should be fixed
* The beta summary report should be produced
* Awards/incentives have been distributed to testers
* Beta testing has been signed off by QA

**4.5 Automated Regression Testing**

**Definition:**

Automated regression testing ensures that any changes made to the software , for example, to fix bugs after release, does not have an impact on code that are not associated with it. New tests are not created for regression testing. Older tests are re-executed. It would be ideal to run a full test if the system after every change however, this would be costly and time consuming so an impact analysis can be done to test which area has the most chance of being affected.

Some benefits of automated regression testing include:

* Can be done with automation tools
* Ensures a better quality of game
* More reliable code

**Participants:**

Automated regression testing will be carried out by QA Eimear Hill.

**Methodology:**

Because manual execution of test cases increases time as well as cost, it would be recommended to use Ranorex Studio. This is an all in one regression test automation for desktop web and mobile app with built in Selenium WebDriver.

An automated suite of test scripts can be built using previously defined test cases in section 4.1. this automated testing should take place anytime new functionality, or a bug fix has taken place.

**Exit Strategy**

The next stage of testing can only begin when:

* All regression tests have been completed
* All major bugs have been identified and fixed
* All documentation has been signed off on

**5.0 TEST SCHEDULE**

|  |  |
| --- | --- |
| **Task name** | **Estimated time to complete** |
| Review Test Document | 2days |
| Training staff on procedures | 5 days |
| Create test cases for unit testing | 2 weeks |
| Run unit test cases | 1 week |
| Verify unit test meets exit strategy | 1 day |
| Create tests for system integration | 1 week |
| Run tests for system integration | 3 days |
| Verify system test meets exit strategy | 1 day |
| Create stress testing environment | 2 day |
| Run stress test | 1 day |
| Verify stress test meets exit strategy | 1 day |
| Set up beta testing requirements | 1 day |
| Write up documentation for beta testers | 1 week |
| Release game to Beta Testers for testing | 2 weeks |
| Collect and analyse data from beta testing | 1 week |
| Return data to developers for any bug fixes | 2 weeks |
| Release game for production | 1 day |
|  |  |

**6.0 CONTROL PROCEDURES**

**Problem Reporting**

Bug reporting will be done using Jira bug reporting software. Jira uses a bug report process template which means that all bugs a reported consistently.

The bug reporting process template for Jira consists of the following methods:

* STR- Steps to reproduce.
* AR- Actual result
* ER- Expected result
* Platform
* Browser
* Software version
* Comments

There is also a status section that allows people to see the status of the report. This consists of:

* Status of report
* Assignee
* Labels
* Test
* To-do
* Checklists
* Smart checklist progress

Every section of the bug reporting template should be filled out by the participant who discovered the bug. This bug will then be assigned for fixing. The person assigned to the bug must keep up to date on the progress report status section. The assigned developer cannot make changes to the code until they have filled out a change report form and that has been signed off on by Team lead Philip Kelly.

**Change Request Form**

Jira will also be used to manage change requests. A new issue type called Change request should be made in Jira. It should be created with the following criteria:

* Project
* Issue type- Change request
* Summary of the request
* Priority
* Name of reporter
* Description of change request

The change request will automatically be assigned to Philip Kelly as he is the only team member with the ability to sign off on change requests.

A condition will be added to the request form meaning that only the person who sent the request will be able to execute the change. Once Philip Kelly has approved the change request, the tester will be notified and can now make the changes to the code ad can close the request.

All units affected and any units that are linked to the changed code will need to be retested using the automated regression method outlined above.

**7.0 FEATURES TO BE TESTED**

* Unit scrolling script
* Game audio script
* Move forwards
* Move backwards
* Jump
* Crouch
* Attack/action
* Pause/resume
* Health script
* Player death script
* Player audio script
* Enemy movement pattern
* Enemy attack pattern
* Enemy health
* Enemy death script
* Enemy audio script
* Projectile movement
* Projectile damage
* Play game button
* Setting button
* Load game button
* Delete game button
* Exit game button
* Intro music script
* Adjust music level script
* Adjust sound effects level script
* Save game function
* Settings button
* Exit game button
* Replay game script
* Exit game script
* The interface between the player character and the enemy character
* The interface between the main menu and the first level.
* The interface between the pause/resume menu and each level
* The interface between each level
* The interface between the final level and the complete scene.
* the interface between the save game and the database
* new module testing
* stress test enemy characters
* beta test:
  + Functionality
  + User interface
  + Response
  + User enjoyment
* Regression testing on unit test cases

**8.0 FEATURES NOT TO BE TESTED**

The background image will not be tested as it does not interact with any other asset on the scene.

**9.0 RESOURCES/ROLES & RESPONSIBILITIES**

|  |  |  |
| --- | --- | --- |
| Staff Member | Role | Responsibilities |
| Philip Kelly | Test Team lead and Project Leader | Write Test design conditions  Sign off on the exit of every stage  Write user acceptance guidelines  Run unit test cases |
| Cherelle Kenny | Tester | Writes test cases for unit testing |
| Jacqueline Howard | Lead Developer | Write test cases for system integration |
| Martin Henry | Developer | Create stress test environment  Distribute documentation for beta testing |
| Ricky Chung | Lead Quality Assurance | Run system integration testing |
| Eimear Hill | Quality Assurance | Run all automated regression testing |
| Saoirse Glynn | Front End Developer | Run stress testing procedures  Analyse beta test results |

**10.0 SCHEDULES**

The deliverables provided before testing begins will be:

* Test plan document
* Prewritten test cases
* Test design conditions for test cases

The deliverables provided during testing will be:

* Test scripts
* Change request forms
* Bug reporting form
* All documentation for beta testers. This should include:
  + Set-up instructions
  + Installation instructions
  + How to play
  + How to uninstall
* Error logs

The deliverables provided after testing will be:

* Test results
* Release notes

**11.0 RISKS/ASSUMPTIONS**

|  |  |  |  |
| --- | --- | --- | --- |
| ***No.*** | ***Risk*** | ***Impact*** | ***Contingency Plan*** |
| 1 | Financial risk- risk of going over budget during game development | high | pinpoint all essential items and team members and determine what can be discarded |
| 2 | Design risk- risk of a lack of user interest | high | Analyse beta findings and add or improve features |
| 3 | Market risk- risk that the market for the game will change before the game is released | medium | Analyse the market and use the findings to improve game for current climate |
| 4 | Technology risk- risk that any of the software the game is reliant on will fail | medium | Create back-ups of all files, Delegate member of team to be in charge of recovery testing |
| 5 | Schedule risk- risk of a delay in the release date | medium | Developers may need to work overnight or weekend shifts to catch up on the work |
| 6 | Quality risk- risk of game breaking bugs | high | All test cases should be re-run and all code should be tested by delegated staff until bug is found and fixed |

**12.0 TOOLS**

Below is a list of all the recommended software tools for testing:

* Jira – Unit Testing
* ReQTest – Beta Testing
* Ranorex Studio - Automated Regression Testing