Object Oriented Software Engineering Project \_ April 2017

Project: Development of a computer system for a Minecraft Game System

Students:

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# **Project Scope**

## **Project work to be accomplished**

The main objective of this project is to develop a “**Sample Software Engineering Model**” of a computer system for a “**Minecraft Game System”**. The game is intended and should be suitable for gamers over age of 5 years. The model would be developed using Object Oriented Concepts. The concept would be presented using Unified Modelling language(UML).

## **The purpose this project?**

The project work being undertaken as part of academic presentation for “**Object Oriented Software Engineering Module-2017”** being studied for the course, “Higher Diploma In Science In Computing HDCBIBM”.

Since this is an academic project with time restrictions only a sub-section of Minecraft is in the project scope.

## **Project Stakeholders**

The project is presented to National College of Ireland by students,

Vinit Date

Rajeeva Revankar

Carl Mohn

## **Exemptions / Out of Project Scope**

There will be no Software Implementation of the project. All material of this project is for academic purpose only.

## **Objectives**

## Technical objectives

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| * Demonstrate the conceptual, practical and technical skills of planning and monitoring a project plan using an appropriate CASE tool |
| * Demonstrate an understanding of [Agile Development](https://moodle.ncirl.ie/mod/resource/view.php?id=10277) |
| * Describe in detail the theory, concepts and methods pertaining to the Unified Modelling Language ([UML](https://moodle.ncirl.ie/mod/url/view.php?id=10226)). |
| * Create requirements using use case modelling concepts. |
| * Demonstrate conceptual and technical skills in the analysis, design and implementation of a software system using Object Oriented Concepts. |
| * Employ tools and techniques for Object Oriented Software Engineering, |
| * Demonstrate an ability to adapt and solve problems in software development activities from specification to [testing](https://moodle.ncirl.ie/mod/resource/view.php?id=10273) individually and as part of a team. |

## Schedule objectives

* Project team formed during wk6 of current semester of this academic year.
* Plan is to develop a “**Sample Software Engineering Model**” of a computer system for a “Minecraft Game System”.
* Project is to be submitted on or before end of wk 13 of the module.

## **Deliverables**

The Project deliverables are listed below. It can be noted that group deliverables are highlighted in GREEN and individual deliverables in BLUE.

1. [Group] Identify the actors.
2. [Group] Construct a Use Case Model.
3. [Individual] Describe in detail any use case from the use case model. The use case must contain an alternate flow.
4. [Group] Create a Project Plan to deliver your application. The plan must include a minimum of 3 nesting levels and include all the major tasks and deliverables.
5. [Individual] Create a conceptual class diagram of the chosen use case. The conceptual class diagram should demonstrate the use of many of the following: attributes, relationships, navigability, association class, multiplicity and composition.
6. [Individual] Create a glossary that lists and defines all the terms that require clarification.
7. [Individual] Draw a System Sequence diagram from the conceptual class diagram.
8. [Individual] Develop Contracts for a minimum of two of the system operations in the system sequence diagram.
9. Individual] Draw Communication diagrams based on the contracts. The communication diagrams should demonstrate the use of design patterns.
10. [Group] Presentation (how well does the package of models look?).
11. [Group] Use of a UML tool.
12. [Group] Put together a Testing Plan outlining how you propose to validate the application and verify that it is free of defects.

## **Success Factors**

* Demonstrate the conceptual, practical and technical skills of planning and monitoring a project plan using an appropriate CASE tool
* Describe in detail the theory, concepts and methods pertaining to the Unified Modelling Language (UML).
* Create requirements using use case modelling concepts.
* Demonstrate conceptual and technical skills in the analysis, design and implementation of a software system using Object Oriented Concepts.

# **Implementation**

## Deliverable Timeline

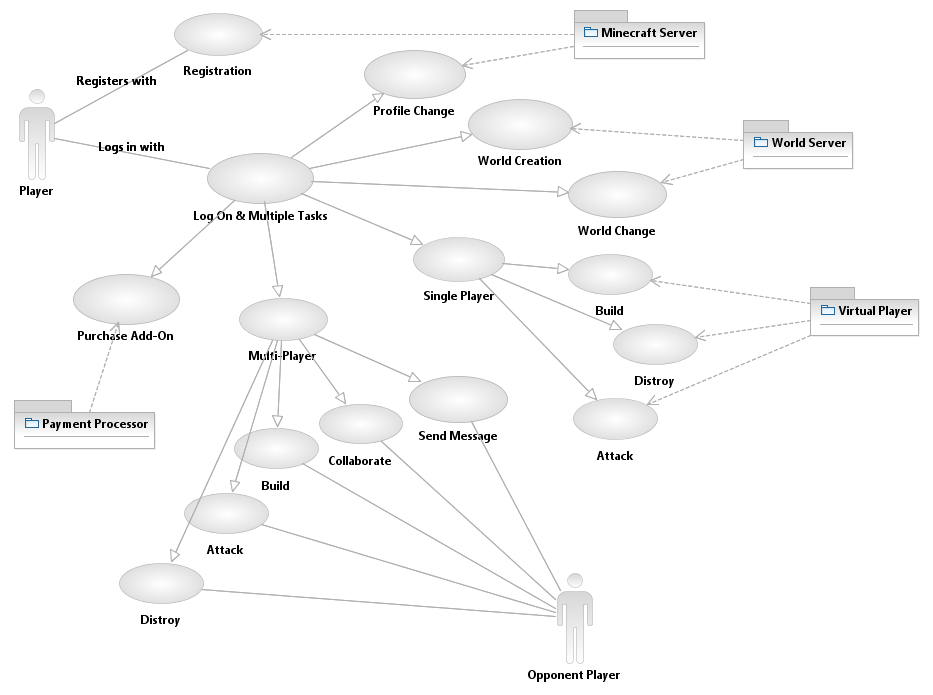
## Implementation (Deliveries)

### Identified the actors

* Player
* Minecraft Server
* World Server
* Virtual Player
* Opponent Player
* Payment processor

### Construct a Use Case Diagram

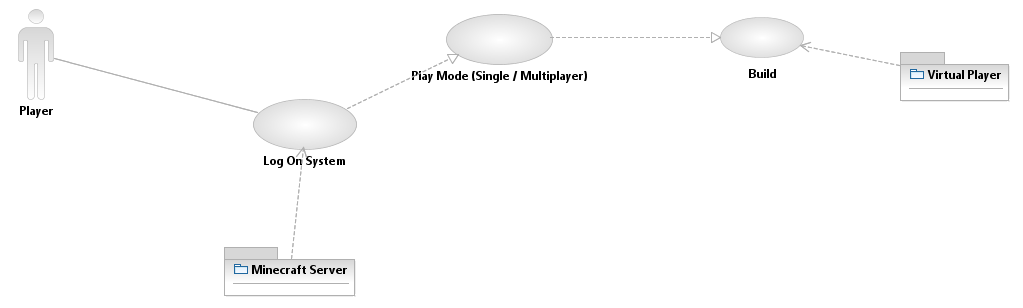
Based on earlier step of identifying actors and use cases, the Use Case Diagram has been plotted using IBM’s Rational Modeler Application tool.



### Describe Use Cases

* Player Register with Minecraft server
* Player Logs in with Minecraft server.
* Player Logs in, The player has option to Create or Update world with World Server
* Player Logs in Start Single Player Game Build/Destroy/Attack with
* opposite Virtual player.
* Player Logs in Starts multiplayer game Cooperate/Build/Destroy/Attack/Send Message with opponent player
* Player logs in buys add on

### Detailed Use Case Diagram for “Build” use case (Contributor:Vinit Date)



## Actors

* Player
* Virtual Player
* Minecraft server (passive actor, needed for authentication)

## Pre-Conditions

* The player is logged into the system.

## Flow of Events

* The player selects to build object
* The object starts getting built.
* The resources needed for object build are deducted from player inventory as the object is being built.
* Object building is finished

## Post-Conditions

* Render surrounding world with finished object

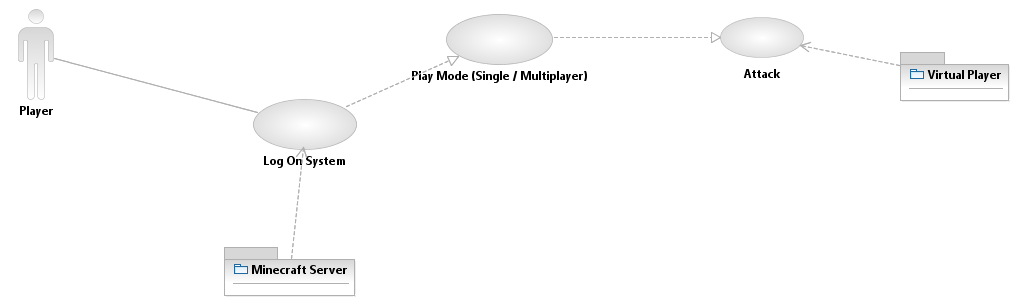
## Alternative Flow of Event

* The player selects to build object
* Object starts to get built
* Not enough resources are found, Object building is stopped as is

## Post-Conditions

* Render surrounding world with unfinished object

### Detailed Use Case Diagram for “Attack” use case (Contributor: Rajeeva Revankar)

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## Actors

* Player
* Virtual Player
* Minecraft server (passive actor, needed for authentication)

## Pre-Conditions

* The player is logged into the system.

## Flow of Events

* The player selects attack
* Cost of attack is deducted from player inventory.
* Object/s in surround are damaged

#### Post-Conditions

* Render surrounding world with damaged object/s

## Alternative Flow of Event

* The player selects attack
* Cost of attack is deducted from player inventory
* Object/s in surround are indestructible e.g. sky / water

## Post-Conditions

* Render surrounding world same as before event.

### Detailed Use Case Diagram for “Collaborate[[1]](#footnote-1)” use case (Contributor: Carl Mohn)

## Actors

* Player x
* Player y
* Minecraft server (passive actor, needed for authentication)

## Pre-Conditions

* The player is logged into the system.
* The player has a container, such as a strongbox available

## Flow of Events

* The player opens the container, and the personal inventory window pops up automatically
* The player clicks and drags objects with the controller to or from the container or inventory window
* If another player wants to acquire the stored resource, repeat the same function

## Post-Conditions

* Adjust player inventory weight by addition or subtraction of resource weight

## Alternative Flow of Event

* The player drops an object outside either the container content window or outside the inventory window
* The object being dragged will drop to the floor level, thus removed from its container or inventory

## Post-Conditions

* Adjust player inventory weight by subtraction of resource weight
* Render the object in-world on the floor level

### Project Plan

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# **Testing and Acceptance Criteria**

For each use case acceptance criteria is as

## Player Register with Minecraft server

#### Capture and Validate Name, Address, Date of Birth and email for new user.

#### Validate Address for country availability.

#### Validate Date of Birth

#### Validate email

## Player Logs in with Minecraft server.

#### Login is not locked or expired.

#### If login fails option to login alternatively example retrieve / change password or use OTP

#### If paid account option to top op

#### If free account invite to change to pay model.

## Player Logs in, The player has option to Create or Update world with World Server

#### Can create world

#### Can update world

## Player Logs in Start Single Player Game Build/Destroy/Attack with opposite Virtual player.

#### A virtual player can be created

#### Player can play with virtual player.

## Player Logs in Starts multiplayer game Cooperate/Build/Destroy/Attack/Send Message with opponent player

#### Can Cooperate/Build/Destroy/Attack/Send Message with opponent player

## Player logs in buys add on

#### Payments can be processed for valid user to buy add on.

# **Glossary**

1. In this case, share resources with another player [↑](#footnote-ref-1)