Asteroid Mining

Team name: Pied Pipers

Title: Concept of Prototype

Supervisor:

Dr. Balla Katalin

Members:

Abdelrahman Desoki	DOHDZF	adesoki@edu.bme.hu
Neda Radonjic	NQC17Y	neda.radonjic@edu.bme.hu
Tushig Bat-Erdene	QBI3JH	bat-erdene.tushig@edu.bme.hu
Chaitanya Arora	BWTFX8	chaitanya.arora@edu.bme.hu
Janibyek Bolatkhan	BOI6FK	janibyekbolatkhan@edu.bme.hu
Kasay Ito	LX5RFB	kasay.ito@edu.bme.hu

April 3, 2022

7. Concept of prototype

7.1 Interface definition of Prototype

7.1.1 General description

Our game program will have two choices of the input command to control the game by the player. First one and default one is from the Keyboard handler(Virtual keys) and according to the taken input key value, the application will perform corresponding actions and the game will be played through. Moreover, the second one is more likely depending on the testing side. Game application runs the whole game scenario through text file context where specific commands are already written. This type of input command usually will be used for testing the game.

7.1.2 Input language

<Mouse Click> Command 1: Start Game

Description: In the main menu, the user can choose the option of starting the game when the “Mouse_Click” is pressed.

Options: Starting the game.

<Virtual Key/Mouse Click> Command 2: Exit Game

Description: In the main menu, the user can choose the option of exiting the game when the associated key is pressed.

Options:

1. Exiting the game by pressing “Mouse_Click”.
2. Exiting the game by pressing “ESC_Key”.

<Virtual Key> Command 3: Settler traveling

Description: When the user presses the key associated with this command, the settler will travel through space.

Options: The settler can either travel between neighboring asteroids or through a teleportation gate by following input keys:

1. Settler goes up by pressing “UP_Key”.
2. Settler goes down by pressing “DOWN_Key”.

3. Settler goes right by pressing “RIGHT_Key”.
4. Settler goes left by pressing “LEFT_Key”.

<Virtual Key> Command 4: Drill

Description: When the user presses “D_Key” with this command, the settler will drill the core of an asteroid.

<Virtual Key> Command 5: Mine

Description: When the user presses the “M_Key” with this command, the settler will mine the resources from an asteroid.

Options:

1. Using “Mine” command, Settler can mine “Carbon”.
2. Using “Mine” command, Settler can mine “Water Ice”.
3. Using “Mine” command, Settler can mine “Uranium”.
4. Using “Mine” command, Settler can mine “Iron”.

<Virtual Key> Command6:Hide

Description: When the user presses the “H_Key” with this command, the settler will hide in the core of a hollow asteroid.

Options:

<Virtual Key> Command7: Build Robot

Description: When the user presses the “R_Key” with this command, the settler will build an AI robot.
Options: The user can choose which asteroid to build the robot on.

<Virtual Key> Command: Build Teleportation Gate

Description: When the user presses the “D_Key” with this command, the settler will build a teleportation gate.

Options:

<Virtual Key> Command: Fill Asteroid

Description: When the user presses the “F_Key” with this command, the settler will fill an asteroid with a unit of resource.

Options: The user can choose which of the available resources the asteroid will be filled with.

<Virtual Key> Command: Deploy Teleportation Gate

Description: When the user presses the “G_Key” with this command, the settler will build a teleportation gate.

Options: The user can choose where the gate will be deployed.

1. Deploying the first gate.
2. Deploying the second gate.

<Virtual Key> Command: Build Space Station

Description: When the user presses the “G_Key” with this command, the settler will build a space station.

<Virtual Key/Mouse Click> Command: Check Inventory

Description: When the user presses the “TAB_Key” with this command, the settler will check the inventory of the spaceship.

<Virtual Key/Mouse Click> Command: Land on the Asteroid

Description: When the user presses the “L_Key” with this command, the settler will land the spaceship in the near asteroid.

7.1.3 Output language

Game Starts:

Description: If the player starts the game, all the major elements in the game are initialized.

Game is exited:

Description: The game is terminated when the player executes the exit command of the game.

Settler travels: When the travel command is given, the settler can move in different directions

Description: The position of the settler changes, and it is assigned to a new Place as a Visitor.

Settler drills: When the drill command is given, the settler drills the core of an asteroid.

Description: The depth of the asteroid's rock mantle is decremented by 1.

Settler hides:

Description: When the hide command is executed, Settler can hide inside of the hollow asteroid.

Settler mines:

Description: When the hide command is executed, Settler can gather resources from a drilled asteroid.

1. Using "Mine" command, Settler can gather "Carbon".
2. Using "Mine" command, Settler can gather "Water Ice".
3. Using "Mine" command, Settler can gather "Uranium".
4. Using "Mine" command, Settler can gather "Iron".

Settler builds a robot:

Description: Robot will be initialized after counting sufficient resources (Iron, Carbon, and Uranium).

Settler builds a teleportation gate:

Description: Teleportation gate will be initialized after counting sufficient resources (Iron, Carbon, and Uranium).

Settler fills an asteroid:

Description: When the fill command is executed, settlers can fill hollow asteroids with resources.

Settler deploys a gate:

Description: When a user pressed the deploy command, Settler can deploy the first or second teleportation gate.

Settler builds a space station:

Description: When the build space station command is executed, Settler can build a space station if the settler has sufficient resources. Players will win the game if the space station is successfully built.

Settler checks inventory:

Description: When the check command is executed, inventory status will be demonstrated.

Settler lands the spaceship on the Asteroid:

Description: When the Land command is executed, the player controls settlers to land its spaceship to Asteroid. It is more demonstrated as attaching the spaceship object to the moving asteroid to be able to dig and mine as well as hiding**.**

Create sunstorm:

Description: The system generates random sunstorm flashes that can hit the asteroids, damaging the visitors that are not hidden.

Check explosive asteroids:

Description: System checks asteroids when they are in the perihelion if the asteroid is explosive or not. Normally the fully drilled asteroid which contains uranium is called a RadioActive asteroid and calls its method **Explode()** inside the class.

7.2 Real use-cases

Use-case name	Start Game
Short textual description	Initializing the game
Actors	Tester
Dialog, scenario	The game can be started when “start game” option is selected from the menu. All the objects on the Asteroid belt, such Asteroids, Resources, Settlers are created.

Use-case name	Travel
Short textual description	Player controls the settler to move and change its position in the asteroid belt.
Actors	Player/User
Dialog, scenario	1. The settler can travel with his spaceship from one asteroid to another asteroid. 2. But also settler can wander in the asteroid belt and pass through the teleportation gates.

Use-case name	Drill
Short textual description	Player controls the settler to drill the Asteroid
Actors	Tester
Dialog, scenario	1. Settler drills the asteroid. This action is executed by the user command input. 2. If settler fully frills the radio-active asteroid when it is in perihelion, it explodes and kills the settler

Use-case name	Hide

Short textual description	Player controls the settler to hide in the asteroid
Actors	Player
Dialog, scenario	1. Settler hides in the fully drilled hollow asteroid. 2. Hiding action is usually executed to escape from the sunstorm

Use-case name	Mine
Short textual description	Player control the settler to mine the asteroid.
Actors	Player
Dialog, scenario	1. Settler can only mine the resource from the fully drilled asteroid. 2. Settler can only mine the resource from the fully drilled asteroid. 3. Settler only can mine when it is in the aphelion.

Use-case name	Fill asteroid

Short textual description	Player controls the Setter to fill the asteroid with a unit of resource
Actors	Player
Dialog, scenario	1.Settler can only fill the asteroid if: - the asteroid is hollow - Settler can select the specific resource from its inventory. - Settler has a available resource in its spaceship's inventory

Use-case name	Build Robot
Short textual description	Player controls the settler to build the Autonomous robot for the further help of drilling the asteroid
Actors	Player
Dialog, scenario	1. Settler only can build the robot if it has enough resources. 2. If the settler does not have enough resources, the system shows a message on the screen regarding the missing resources. 3. Setter can choose one of the neighboring asteroids to place the newly created robot.

	4. Newly built robot is controlled by the system autonomously.

Use-case name	Build Teleportation Gates
Short textual description	Player controls the settler to build the teleportation gate in the asteroid belt.
Actors	Player
Dialog, scenario	1. Settler only can build the teleportation gates if settler has enough resources. 1. If the settler does not have enough resources, the system shows a message on the screen regarding the missing resources. 2. Settler only can carry two gates at a time.

Use-case name	Deploy Gate
Short textual description	Player controls the settler to deploy the teleportation gate.
Actors	Player
Dialog, scenario	1. Gates are only deployed successfully if

	- Settler has available teleportation gate(normally settler only can carry two gates) 2. Settler deploys one gate at a time. 3. Newly deployed gates are connected with its pairs and ready for the visitors to pass through.

Use-case name	Check Inventory
Short textual description	Player checks the current inventory of settler
Actors	Player
Dialog, scenario	Player performs this action to see the current collected resources and their amount. And also the teleportation gates that the settler is carrying.

Use-case name	Land on the Asteroid
Short textual description	Player controls settler to land its spaceship to the asteroid
Actors	Player
Dialog, scenario	Player performs this action to be able to reach the asteroid and do his/her work and mission.

Use-case name	Build SpaceStation
Short textual description	Player controls the settler to build the Space Station.
Actors	Player
Dialog, scenario	1. Building Space station is the main goal of this game. 2. Settler only can build a space station if it has enough necessary resources. 3. Building the SpaceStation puts the final point of the game. And Settler wins the game.

7.3 Test plan

Name of the test-case	Showing the GUI
Goal	Interface of the game showed properly
Short description	Make sure that the GUI of the game has displayed properly on the user screen.

Name of the test-case	Starting the game

Goal	Making sure that the game starts appropriately
Short description	Test case made to check whether the game starts properly and the user can press the buttons and start playing or not.

Name of the test-case	Build the space station
Goal	Testing if the space station can be built
Short description	Test case made to check if the user presses the key, is the space station created or not.

Name of the test-case	Settler traveling
Goal	Testing if the settler can travel
Short description	Test case for checking whether the settler can travel in all directions including the asteroid belt, checking whether the settler can travel after pressing keys.

Name of the test-case	Settler Drills
Goal	Checking what changes after the settler drills.
Short description	Test cases for parameters will be changed after the settler drills the asteroid, the depth of the hole and whether the mantle has been drilled or not.

Name of the test-case	Settler Mine
Goal	Checking what changes after the settler Mine.
Short description	Test cases for parameters will be changed after the settler mines the asteroid, the depth of the hole, layer of mining (at aphelion) and whether the mantle has been drilled or not.

Name of the test-case	Filling Asteroid
Goal	Check the capacity of the asteroid
Short description	Testing the amount of resources after settlers filling the asteroid and checking the depth of the hollow.

Name of the test-case	Destination of settler from Prehilion
Goal	Check if the settler is at perihelion layer or not
Short description	Checking the place of the settler and is settled at perihelion layer or out of it.

Name of the test-case	Building the robot
Goal	Check if the settler can build the robot
Short description	This test case was made to check whether the settlers can build an uncontrollable robot, and the amount of resources decreased after building it.

Name of the test-case	Building Teleportation gates
Goal	Check if the settler can build the teleportation gates
Short description	This test case was made to check whether the settlers can build teleportation gates, and the amount of resources decreased after building it.

Name of the test-case	Deploying the gate
Goal	Check if the settler can Deploy the teleportation gates
Short description	This test case was made to make sure that settlers deploy the gate , and the location of the gate will be changed with its own neighbors.

Name of the test-case	Hiding settler
Goal	Object of settler existing or not
Short description	This test case was made to make sure if the settler is able to do any operation except becoming visible again.

Name of the test-case	Deploying the gate
Goal	Check if the settler can Deploy the teleportation gates
Short description	This test case was made to make sure that settlers deploy the gate , and the location of the gate will be changed with its own neighbors.

Name of the test-case	Death of the settler
Goal	Checking the health of the settler after explosion
Short description	Testing whether the settler will die if an explosion happened or not.

Name of the test-case	Decreasing in settler health
Goal	Checking the health of the settler after sunstorm
Short description	Testing whether the settler will die if a sunstorm happened or not while the settler is visible.

Name of the test-case	Visible sunstorm
Goal	Checking whether sunstorm is visible or not
Short description	Test case made to check the location of the settler, whether the settler is hollow or not.

Name of the test-case	Carrying Resources
Goal	Check if settler can carry resources or not
Short description	Test case was made to check whether it's safe or not to carry resources.

Name of the test-case	Checking inventory
Goal	Gui should show the settler the amount of each resource
Short description	Test case made to check the number of resources in each state of the game.

Name of the test-case	End game
Goal	Checking whether the settler wins or loses
Short description	Test case made to check whether settlers can end the game by either building a space station or losing the game damage(explosion-sunstorm).

7.4 Support programs for testing

At the current phase of the game program, we have developed a well working skeleton program which makes users able to already test the game by selecting the actions from the console menu and see its printed output values, such as methods and response texts as well user interface questions.

However, for the future features and complete version of the application, we are planning to make the program be able to be tested through both JUnit testing and text file (which is mentioned in the 7.1.1)

7.5 Protocol

Start (date & time)	**Duration (hours)**	**Performer(s) name**	**Activity description**
30/3/2022 18:30-20:30	2.5 hours	Tushig and Neda	Defining the input/output language.
30/3/2022 18:18 to 20:30	2 and half hours	Kasay and Desoki	Writing the 19 test cases with some detailed instructions.
30/3/2022 18:00 to 20:30	2 and half hours	Janibyek and Chaitanya	Completed 7.2 Real Use Cases artifact.s