[7# Concept of Prototype]

[5] – [SoftProLab Team]

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7. Concept of prototype

7.1 Interface definition of Prototype

[The goal of this chapter is to define a language to specify test-cases. The input language is used for describing the user's activity, the user's commands. The system's responses are specified as output language. Because the system's behaviour is occasionally random (it exludes deterministic testing), consequently the random features should be switched off and simulated appropriately for executing deterministic tests.]

7.1.1 General description

[Input and the output ought to be made in the following way: input can be taken from a file and output can be saved in a file, instead of simple use keyboard and display. Input and output ought to be implemented on character level, consequently only the standard input and output are allowed to use in the prototype.]

There are two kinds of input that prototype interface receives: First one is user input which can be a command or a list of commands separated by the new line and the output is also shown through a command line. These input commands will be explained in Input and Output languages in the next sections. The next one is file input in which commands will also be separated by the new line and the output will be written in a different file. (Input and output files are to be different for each test case.)

7.1.2 Input language

Prototype receives commands textual format, from text file. It processes commands line by line, each line containing only one command. Lowercase letters represent command and uppercase letters represent parameters of the command. The possible commands and example parameter inputs are listed below. Description explains actions of written command, options explains options of parameter input of command and example usage gives example of that command.

run FILENAME
> **Description:** Opens the inputted file and executes commands written in it
> **Options:** files which include commands
> **Example usage:** run file1

load FILENAME
> **Description:** Loads the output from given file to command line
> **Options:** files which include outputs
> **Example usage:** load file1

save FILENAME
> **Description:** Saves the output to the given/new file
> **Options:** any empty file
> **Example usage:** save file1

start GAME

Description: starts game and initializes asteroids, settler etc
Options: any available variable name for game objects
Example usage: start game1

move SETTLER PLACE
Description: Moves given settler to given asteroid/teleportation gate
Options: any available settler object and places neighboring to asteroid that settler is on
Example usage: move settler

drill SETTLER
Description: Given settler drills asteroid it is on if remaining depth of mantle is more than zero
Options: any available settler
Example usage: drill settler1

mine SETTLER
Description: Given settler mines asteroid it is on if mantle has been drilled through
Options: any available settler
Example usage: mine settler1

getneighbors SETTLER
Description: returns the list of neighboring places (asteroids, gates) to asteroid that settler is on
Options: any settler
Example usage: getneighbors settler1

hide SETTLER
Description: hides settler in the core if asteroid it is on is hollow
Options: any settler
Example usage: hide settler1

hide SETTLER ITEM
Description: Settler hides the item ,if there's any, in the core of asteroid settler is on if asteroid is hollow
Options: any settler, any item it has
Example usage: hide settler1 uranium1

createrobot SETTLER
Description: settler creates robot if it has required minerals and places it on asteroid settler is on
Options: any settler
Example usage: createrobot settler1

creategate SETTLER
Description: settler creates gate if it has required minerals and places it in inventory if it has enough place or puts on the asteroid if doesn't have place
Options: any settler
Example usage: creategate settler1

createstation SETTLER

      Description: settler creates station if the asteroid it is on has required minerals
      Options: any settler
      Example usage: createstation settler1

deploygate SETTLER GATE

      Description: settler deploys gate on neighborhood of asteroid it is on
      Options: any settler any gate it has
      Example usage: deploygate settler1 gate1

place SETTLER ITEM

      Description: settler places given item on the asteroid settler is on
      Options: any settler, any item it has
      Example usage: place settler1 iron2

7.1.3 Output language

The standard output will display the prototype states with possible outputs. And if the user enters a wrong input, output will show some errors and exception messages. Explanation for all the output and its parameter are given below:

Invalid command Error

      Description:if user enter command that does not exist or parameter of command was not correct, this error message will be sent.

FILENAME: Name of a file to save certain commands

FILENAME already exists

      Description: If the given filename is already saved on the user's machine and user tries to save a file under same name this message will be shown.

FILENAME not found

      Description:if user tries to access a file that is not accessible or does not exist this message will be shown.

FILENAME not saved

      Description:if user tries to access a file that is open and still worked on in program, this message will pop up.

starts GAME

      Description: All the objects i.e settler, asteroids etc will be intialized in the different places. A message with successful initialization will be shown.

move settler on ASTEROID OR TRANSPORTATION GATE

Description:A message with traveling will be shown. settler get the address of nearby Asteroid/gate through place and get moved to that address.

settler drill on ASTEROID

Description:A message with drilling will be shown. Drills the Asteroid 1 unit each time. In case it's hollow, a message with asteroid being hollow will be shown.

settler mine on ASTEROID

Description: Gets some units of homogenous resource/mineral object from the core of Asteroid while mining. If it's a radioactive asteroid at perihelion state, trying to mine it will result in it exploding and killing settler.

settler DIES

Description:if the settler gets killed either by something like sunstrom or a exploding asteroid a message with Game Over will be shown.

settler getsNeighbors

Description:shows a list of nearby asteroids/gates to the user.

settler hides on ASTEROID

Description:if a asteroid is hollow and settler tries to mine it, instead of mine a hide option will show that asks whether user want to hide in core of asteroid or not.

settler hides MINERALS on ASTEROID

Description:if a asteroid is hollow then settler can chose to hide his minerals inside it. A message asking whether user want to hide material or themself will be shown.

settler createdbot ON ASTEROID

Description:creates a A.I robot by using certain materials and place the robot on the Asteroid that settler is currently on. A message which states what user want to build(robot, gate) will be shown. Choosing Robot will result in this.
          Example Usage: Created robot asteroid2

settler createdgate on PLACE

Description:A message stating what user want to build gate/robot/spaceship will be shown and choosing gate will result in settler building it.

settler deploysgate on PLACE

Description:with the help of getneighbor to get list of nearby asteroid, settler deploys the gate to one of the asteroid in the place.

settler createdstation On ASTEROID

Description:when settler collected all the materials a message will pop up asking user if they want to build a spaceship and depending on user response it'll result in making of spaceship on a asteroid.

Example Usage: created spacestation asteroid4

createdSunstrom on ASTEROID

Description:random generated sunstrom hits the different asteroids. When it is generated a message alerting about its arrival will be shown to settler.

settler CapacityFull

Description:if the settler's inventory gets full and they tried to store more minerals a message with full inventory will be shown.

7.2 Real use-cases

[Detailed use-cases, refer to the elements of the UI (commands of the input language). Separate table for each use-case]

Use-case name	Start game
Short textual description	Initializing the game
Actors	Tester
Dialog, scenario	The game gets started whenever the player chose the option from menu. The settler is created and placed in one of the asteroids

Use-case name	Move settler
Short textual description	Changing settler location in asteroid belt
Actors	Tester
Dialog, scenario	The settler can travel from one asteroid to another one that is on neighborhood. When settler choose MOVE option the neighbor asteroids will appear and settler will chose.

Use-case name	Drilling
Short textual description	Drilling the asteroid
Actors	Tester
Dialog, scenario	The settler and the robot can drill the asteroid they are on by choosing DRILL option from menu, to get into the core. Once the depth of the asteroid is 0, the drilling is done.

Use-case name	Mining
Short textual description	Mining the sources
Actors	Tester
Dialog, scenario	The settler is to mine the minerals after the drilling is completed, mine option will appear on the screen to collect all necessary sources. So, the build station can be built
Use-case name	Build space station
Short textual description	To create space station and win the game
Actors	Tester
Dialog, scenario	When settler have required minerals he can choose build space station from menu

Use-case name	Build Robot
Short textual description	Creating robot
Actors	Tester
Dialog, scenario	The settler can build robot if he has required resources by choosing build robot from options.

Use-case name	Create Asteroids
Short textual description	Creating asteroids
Actors	System
Dialog, scenario	Radioactive, Hallow or normal asteroids is created by the system and placed on asteroid belt.

Use-case name	Fill the asteroid
Short textual description	Hollow asteroid can be filled with the resources carried by the player.
Actors	Tester
Dialog, scenario	When the asteroid has been completely drilled through and a messgae appears on the screen that the asteroid is empty, along with that message, two options are going to appear on the screen, first option would be 'fill the asteroid' and second option would be 'hide in the asteoid'.

Use-case name	Hide
Short textual description	Hiding in the asteroid
Actors	Tester
Dialog, scenario	When the asteroid has been completely drilled through and a messgae appears on the screen that the asteroid is empty, along with that message, two options are going to appear on the screen, first option would be 'fill the asteroid' and second option would be 'hide in the asteoid'

Use-case name	Start SunStorm
Short textual description	SunStorm will appear in asteroid belt.
Actors	System
Dialog, scenario	Sunstorm will start randomly in the asteroid belt at given

	times.

Use-case name	Build teleportation gate
Short textual description	Building teleportation gates
Actors	Tester
Dialog, scenario	When settler have enough resource he can choose "Build teleportation gate" from menu. The reosurces counter would decrease because the player has used those resources to build the gates

Use-case name	Transport
Short textual description	Transported to other asteroid
Actors	Tester
Dialog, scenario	By using the gate the settler or robot is going to get transported to the other asteroid.If there are more gates the transport will become randomly.(so settler will not know before where he will transport)

Use-case name	Deploy gate
Short textual description	The settler can deploy gate on any asteroid he wants.
Actors	Tester
Dialog, scenario	Settler will choose from menu deploy gate option and deploy the gate to near of one asteroid.

7.3 Test plan

[The plan has to contain definition of testing based on comparison of the input and the output file. A test-case demonstrates the correctness of a coherent unit of functionality defined in a scenario. Test-cases are defined by informally (in textual form, 1-5 sentences). Each test-case should have a clear goal, and should refer to the unit of functionality, use-case and the classes or other software elements to be tested. Each test-case requires separate table.]

Name of the test-case	Generate Starting Screen
Goal	Display the starting screen.
Short description	When the player starts the game, the first thing it sees is the starting screen in which player choses different options to start the game

Name of the test-case	Player appearing on the screen
Goal	The player can be seen on the screen.
Short description	Once the player has

Name of the test-case	Player can be seen in space
Goal	The picture of the settler appears.
Short description	When the user press start the game button on the main menu, player can see the picture of the settler on the screen

Name of the test-case	Player can land on asteroid
Goal	Player can travel to asteoid
Short description	Plyaer can easily travel to different asteroid by using proper controls.

Name of the test-case	Player can mine
Goal	The goal is to mine the asteroid
Short description	Player can easily mine the asteroid and collect resources

Name of the test-case	Player can drill
Goal	The goal is to drill the asteroid
Short description	Player can easily drill the asteroid

Name of the test-case	Player can hide
Goal	To hide in the asteroid
Short description	Player can hide in the asteroid, if the asteroid is hollow and fully drilled

Name of the test-case	Player can use minerals to build teleportation gates.
Goal	To build gates
Short description	Player can build the gates if it has enough resources available to build one.

Name of the test-case	Player can use minerals to build robots.
Goal	To build robots
Short description	If the player has enough resouce defined in the code then the palyer can easily build a gate.

Name of the test-case	Robots can travel
Goal	Travelling to different asteroid
Short description	Player can travel in space and land on different asteroid.

Name of the test-case	Robot can hide in the hollow asteroid
Goal	To hide in the asteroid.
Short description	Player can hide in the hollow asteroid if the asteroid is fully drille through.

Name of the test-case	Player/Robot can use the teleportation Gates
Goal	Travel to different neighbouring asteroid.
Short description	Pair of Gates can be used if the player wants to travel to different neighbouring asteroid easily without waisting time.

Name of the test-case	Sandstorm blowing
Goal	Sandstom seen on the screen
Short description	It can be seen on the screen if the sandstorm is blowing or not, so the player becomes alert.

Name of the test-case	Player steps on radioactive asteroid
Goal	Player land on radioacive asteroid
Short description	While travelling, its possible that player lands on radioactive asteroid, the player wont know if its radioactive asteroid or not unless and untill the player doesnt drill it.

Name of the test-case	Radioactive asteroid at perihilion explodes
Goal	Asteroid explodes if drilled
Short description	If the asteroid is radioactive and at perihilion then the asteroid is going to explode and the player may ge damaged.

Name of the test-case	Player dies
Goal	Game over written on screen
Short description	Player can dies in many ways and when the player does game is finished.

Name of the test-case	Score board changes
Goal	Numbers on score board changes.
Short description	Whn the player collects minerals the score of the player increases respectively.

Name of the test-case	Minerals score increases/decreases
Goal	Mineral counter increases
Short description	It means that the player keep track of how many different minerals its has collected so he knows how many more does it needs to collect

Name of the test-case	Space station build successfully
Goal	Player builds the space station
Short description	When the player has enough resources, the player can build the space station which is the actual goal of the game.

Name of the test-case	Settler doing one operation in a single move
Goal	Performing one Operation in a single time.
Short description	Settler can perform drilling, mining, travelling at one time only. Settlers cannot perform two operations at a single time.

Name of the test-case	Settler filling the hollow asteroid with resources
Goal	To fill the asteriods with resources
Short description	Settler can check if the asteriod is empty through drilling, if it is, the settler can fill it later with the resources that the settler has collected so far.

Name of the test-case	Settler surviving the sunstorm if hiding in the hollow asteroid
Goal	To surive the sunstorm
Short description	If there is a sunstorm, the settler can first check by drillig if the asteriod is hollow, if it is then the settler can hide in it if there is a sun storm.

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Name of the test-case	Asteroid with water ice sublimates at perihilion
Goal	The water ice sublimates (disappears)
Short description	If the asteroid that contains water Ice and is at perihilion, then the water ice is going to diasppear

Name of the test-case	Settler deploys the gates in the vicinity of the of the asteroid the settler is on.
Goal	To deploy the gate in the vicinity of the asteroid
Short description	Player can deploy the gates if it has enough resources, then it can use the gate to travel from one asteroid to toher asteroid easily.

7.4 Support programs for testing

[Specification of supporting programs (converter, generator, evaluator, etc), if any.]

No support programs for testing.

7.5 Protocol

Start (date & time)	Duration (hours)	Performer(s) name	Activity description
24.03.2021	60 minutes	Salahov Kamal, Gurdeep Singh	Meeting and dividing tasks
26.03.2021	2 hours	Salahov Kamal	7.1.2
26.03.2021	2 hours	Gurdeep Singh	7.1.3
26.03.2021	2 hours	Areeba T. Shoaib	7.3 , 7.4
26.03.2021	2 hours	Subhan	7.1.2
26.03.2021	2 hours	Ali	7.2