OOP

Practical 6, Week 6

Submission

1. Your submission should contain two files. One of these files is **PDF** document with screenshots of the implementation (Java code) and testing only. Another file is **ZIP** file with the Java project.
2. You must save the files with name

   {YourStudentNumber}-Practical6.pdf;

   {YourStudentNumber}-Practical6.zip;

   For example: 202107081314-Practical6.pdf, 202107081314-Practical6.zip
3. You must upload from the student website: student.zy.cdut.edu.cn

Marking scheme

You will gain up to 5 marks for the completion of the exercise.

The markers will use the following marking scheme for each exercise.

Rubric	marks
No attempt has been made to answer the question. No implementation at all, or completely inappropriate considerations	0
Some attempt has been made to design the algorithm, and some considerations shown. No effort to implement a working solution and test it.	1
Incomplete design/programming, but significant effort has gone into it. Some consideration and implementation of the result, but very limited, some of the rules have not been properly implemented, no testing.	2
Mostly complete design but the implementation does not match the design or does not follow a correct standard. The program works but does not use loops and string methods properly.	3
Complete design with fair to good implementation, and some testing shown.	4
Excellent design and implementation of the whole problem, including testing and implementation.	5

OOP

Week 6, Assessed exercise

(Details see the file "OOP Week 6 exercises.docx")

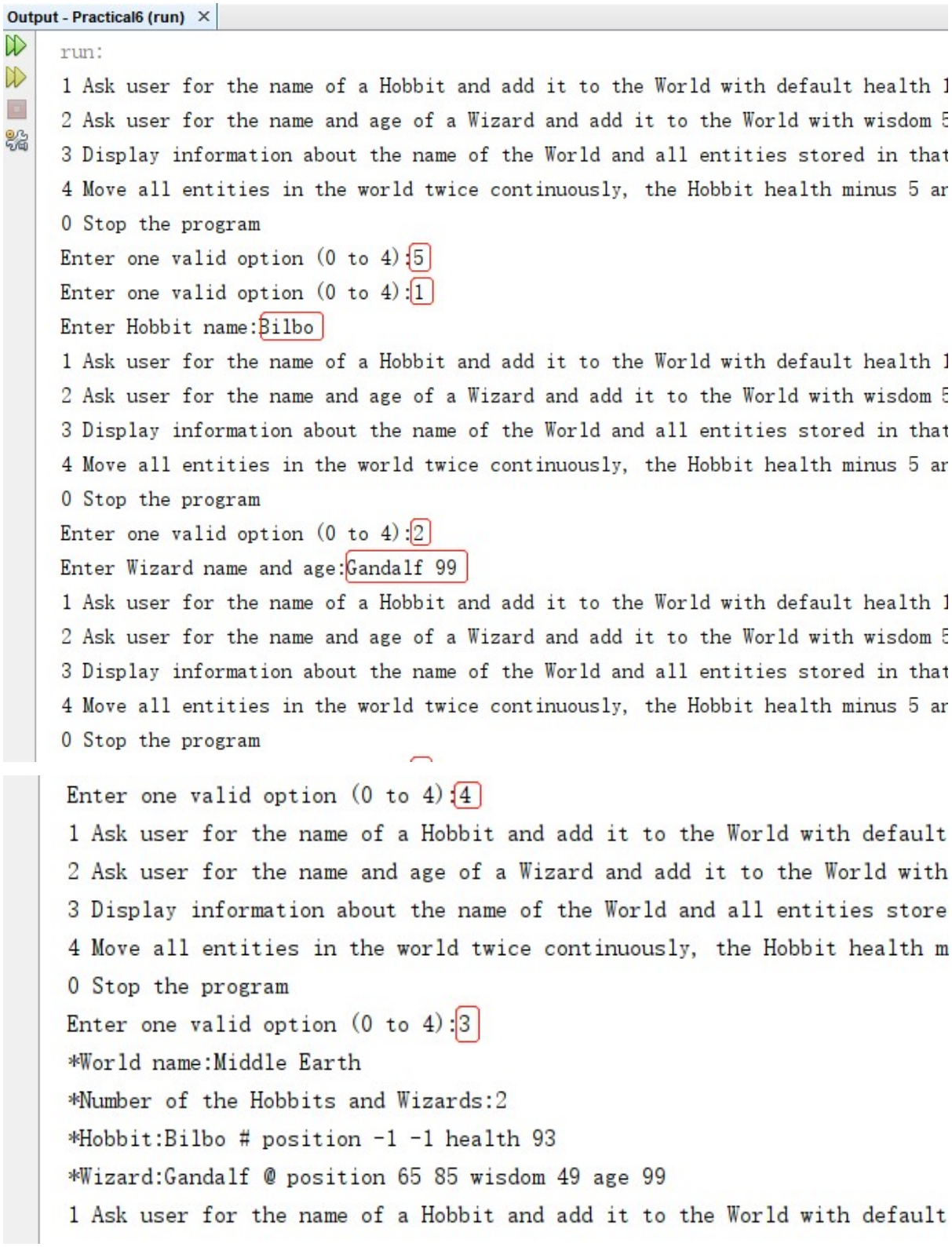
Main program (Main class)

Based on Exercise 1 to Exercise 8 this week and code "OOP Practical 6 - Student start version" we are going to use an instance of **World** on the **main class** to store **entities** in our world. And, the world name is **"Middle Earth"** .Your main program will consist of a **menu** that will show all the options until the user stops with the following options (Use while loop to ask user input an option until the input option is valid):

1. Ask user for the **name** of a **Hobbit** and add it to the **World** with default **health** 100.
2. Ask user for the **name** and **age** of a **Wizard** and add it to the **World** with **wisdom** 50.
3. Display information about the **name** of the **World** and all entities stored in that **World**. *(Requirements: the symbol of Hobbit is "#", the symbol of Wizard is "@". You should display the information of all the entities based on the symbols)*
4. Move all entities in the **world** twice continuously. The health of Hobbit minus 5 more and the wisdom of Wizard minus 1 after moved twice continuously.
0. Stop

Implement a **static menu method** for the menu in main program for you to call in main method.

Sample Testing Case with Four Steps and Result
(The red rectangles are the inputs)



Complete the implementation and testing.

（1） Implementation

(Please show your design with some comments in your program and paste the source code of Main.java here with screenshots)

```java
package Practical6;
import java.util.ArrayList;
import java.util.Scanner;
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

public class Main {

    0 个用法
    public static void main(String[] args) {
        World world = new World( name: "Middle Earth");
        //Create a world named 'Middle Earth'
        menu(world);
        //Call the method 'menu'
    }

    /*
    A menu that will show all the options until the user stops with the following options (Use while loop to ask user
    input an option until the input option is valid):
    1.Ask user for the name of a Hobbit and add it to the World with default health 100.
    2.Ask user for the name and age of a Wizard and add it to the World with wisdom 50.
    3.Display information about the name of the World and all entities stored in that World. (Requirements: the symbol
      of Hobbit is "#", the symbol of Wizard is "@". You should display the information of all the entities based on the
      symbols)
    4.Move all entities in the world twice continuously. The health of Hobbit minus 5 more and the wisdom of Wizard
      minus 1 after moved twice continuously.
    0.Stop

    Implement a static menu method for the menu in main program for you to call in main method
    */
    1 个用法
    public static void menu(World world) {

        int option;
        //Declare the option variable
        ArrayList<Entity> entities = world.getTeam();
        //Store the entities of world in the array list 'entities'
        do {
            System.out.println("1 Ask user for the name of a Hobbit and add it to the World with default health 100");
            System.out.println("2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50");
            System.out.println("3 Display information about the name of the World and all entities stored in that World");
            System.out.println("4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1");
            System.out.println("0 Stop the program");
            //Print the options in menu
            Scanner input = new Scanner(System.in);
            /*
            Ask for the correct option 0 to 4
             */
            option = -1;
            //Initialize option to -1 to ask for the user's options
            while ((0 > option) || (option > 4)) {
                System.out.print("Enter one valid option (0 to 4):");
                option = input.nextInt();
            }
```

```
56
57          switch (option) {
58              case 1:
59                  //The user enters option1
60                  System.out.print("Enter Hobbit name:");
61                  String nameHobbit = input.next();
62                  //Reads user input hobbitName
63                  Entity hobbit = new Hobbit(nameHobbit, health: 100);
64                  //Create instance hobbit
65                  world.addEntity(hobbit);
66                  //Add the instance hobbit to world
67                  break;
68              case 2:
69                  //The user enters option2
70                  System.out.print("Enter Wizard name and age:");
71                  String nameWizard = input.next();
72                  int ageWizard = input.nextInt();
73                  //Ask the user for the Wizard's name and age
74                  Entity wizard = new Wizard(nameWizard, ageWizard, wisdom: 50);
75                  //Create instance Wizard
76                  world.addEntity(wizard);
77                  //Add the instance Wizard to world
78                  break;
79              case 3:
80                  //The user enters option3
81                  System.out.println("✳World name:"+world.getName());
82                  //Display world names
83                  System.out.println("✳Number of the Hobbits and Wizards:"+entities.size());
84                  //Displays the number of entities in the world
85                  for (Entity entity:entities) {
86                      //For every entity in the world
87                      String symbol = entity.getSymbol();
88                      //Through its symbol
89                      if (symbol.equals("#")) {
90                          //If the symbol is #, print hobbit
91                          Hobbit hobbit1 = (Hobbit) entity;
92                          System.out.println("✳Hobbit:"+hobbit1.getName()+" # position "+hobbit1.getX()+" "+
93                                  hobbit1.getY() + " health "+hobbit1.getHealth());}
94                      if (symbol.equals("@")) {
```

```
                        //If the symbol is @, print wizard
                        Wizard wizard1 = (Wizard) entity;
                        System.out.println("*Wizard:"+wizard1.getName()+" @ position "+wizard1.getX()+" "+
                                wizard1.getY() + " wisdom "+wizard1.getWisdom()+" age "+wizard1.getAge());}
                    }
                break;
            case 4:
                //The user enters option4
                for (Entity entity:entities) {
                    String symbol = entity.getSymbol();
                    //The symbol determines whether the entity in the world is a hobbit or a wizard
                    if (symbol.equals("#")) {
                        //After hobbit move2 times in a row, health is reduced by 5
                        Hobbit hobbit1 = (Hobbit) entity;
                        hobbit1.move();
                        hobbit1.move();
                        int health = hobbit1.getHealth();
                        health -= 5;
                        hobbit1.setHealth(health);
                    }
                    if (symbol.equals("@")) {
                        //After wizard move2 times in a row, wisdom decreases by 1
                        Wizard wizard1 = (Wizard) entity;
                        wizard1.move();
                        wizard1.move();
                        int wisdom = wizard1.getWisdom();
                        wisdom --;
                        wizard1.setWisdom(wisdom);
                    }
                }
                break;
            case 0:
                //The user enters option 0, breaks directly and uses the while condition to stop the program
                break;
        }
    } while (option != 0);//End when option is 0
  }
}

```

（2） Testing

Testing 1 (Same sample test case)

```
D:\KaiFa\JAVA\bin\java.exe "-javaagent:D:\KaiFa\IntelliJ IDEA Community Edition 2022.3.2\lib\idea_rt.jar=
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):5
Enter one valid option (0 to 4):1
Enter Hobbit name:Bilbo
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):2
Enter Wizard name and age:Gandalf 99
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):3
*World name:Middle Earth
*Number of the Hobbits and Wizards:2
*Hobbit:Bilbo # position 0 0 health 100
*Wizard:Gandalf @ position 0 0 wisdom 50 age 99
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):4
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):3
*World name:Middle Earth
*Number of the Hobbits and Wizards:2
*Hobbit:Bilbo # position -2 -3 health 93
*Wizard:Gandalf @ position 72 77 wisdom 49 age 99
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):0

进程已结束,退出代码0
```

Testing 2 (Your own different test case – same options but different hobbit and wizard)

```
D:\KaiFa\JAVA\bin\java.exe "-javaagent:D:\KaiFa\IntelliJ IDEA Community Edition 2022.3.2\lib\idea_rt.jar=
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):-3
Enter one valid option (0 to 4):-4
Enter one valid option (0 to 4):9
Enter one valid option (0 to 4):1
Enter Hobbit name:David
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):2
Enter Wizard name and age:Lucy 99
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):3
*World name:Middle Earth
*Number of the Hobbits and Wizards:2
*Hobbit:David # position 0 0 health 100
*Wizard:Lucy @ position 0 0 wisdom 50 age 99
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):4
```

```
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):3
*World name:Middle Earth
*Number of the Hobbits and Wizards:2
*Hobbit:David # position 1 1 health 93
*Wizard:Lucy @ position 33 0 wisdom 49 age 99
1 Ask user for the name of a Hobbit and add it to the World with default health 100
2 Ask user for the name and age of a Wizard and add it to the World with wisdom 50
3 Display information about the name of the World and all entities stored in that World
4 Move all entities in the world twice continuously, the Hobbit health minus 5 and Wizard wisdom minus 1
0 Stop the program
Enter one valid option (0 to 4):0

进程已结束,退出代码0
```