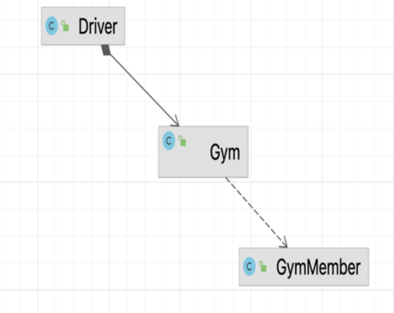
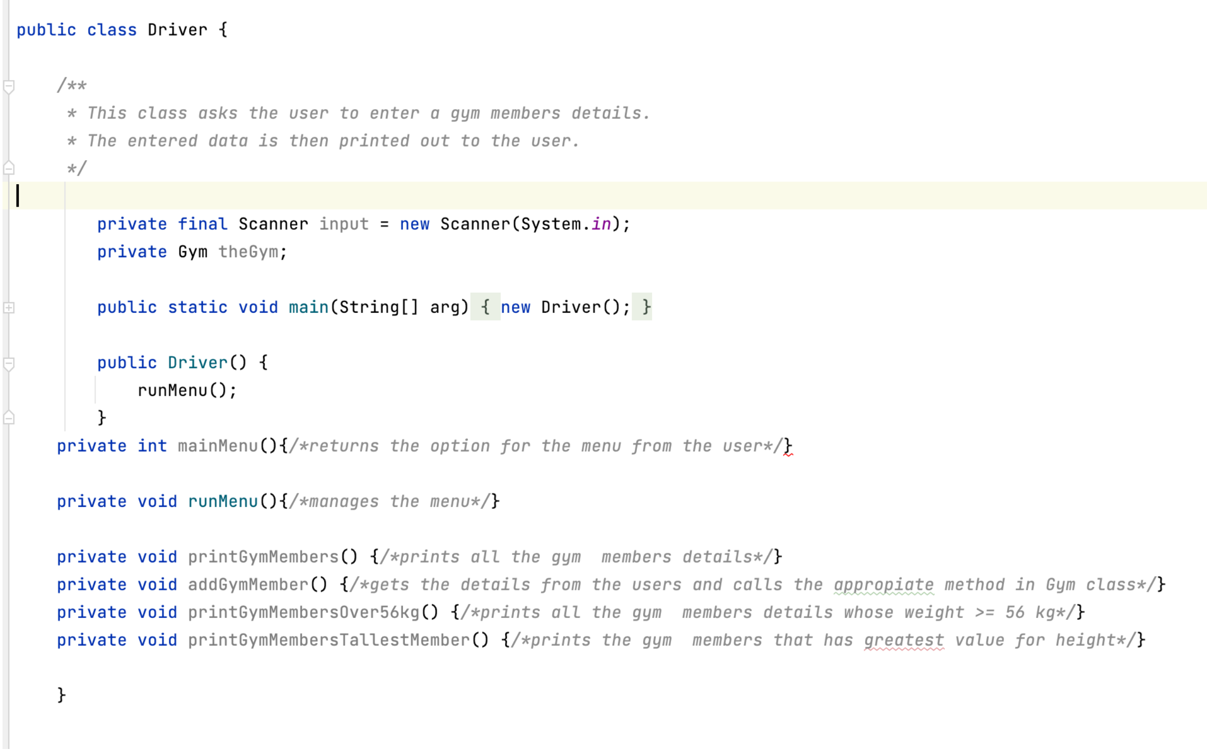


Class Diagram

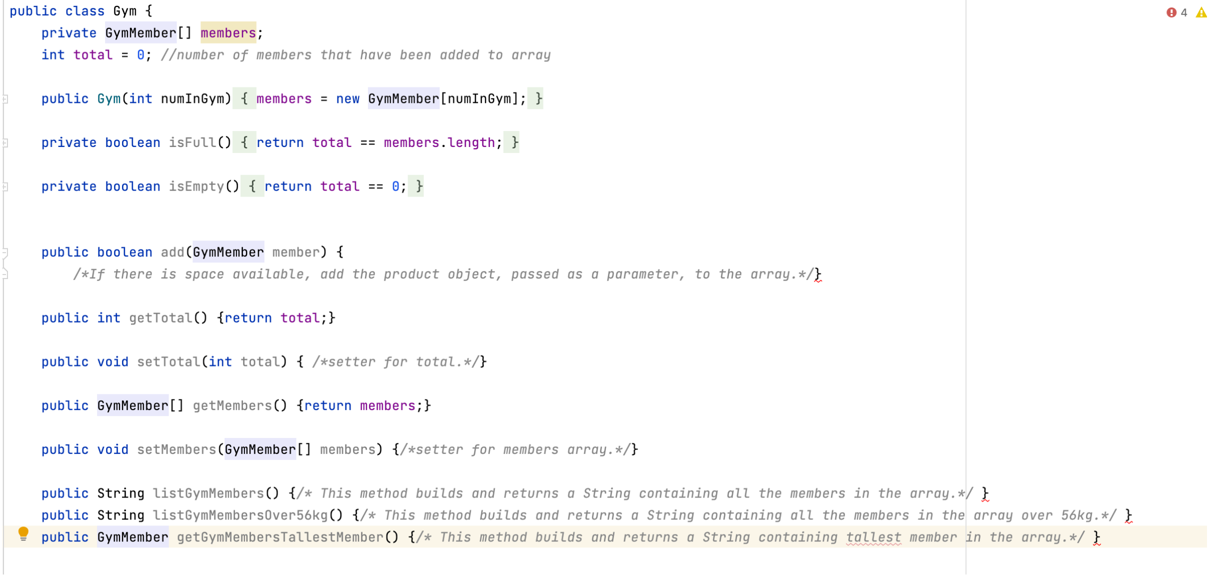
All questions in this exam are based on one app.

Skeleton Driver Code



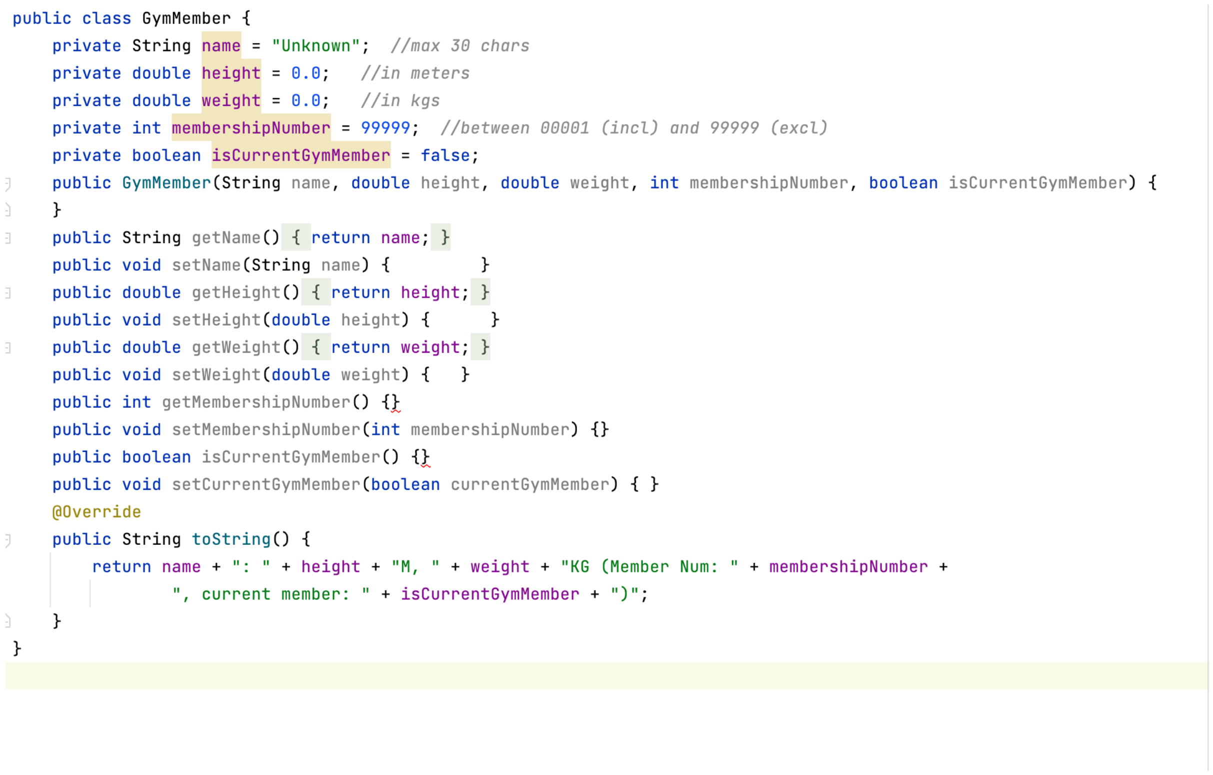
```java
public class Driver {

    /**
     * This class asks the user to enter a gym members details.
     * The entered data is then printed out to the user.
     */

        private final Scanner input = new Scanner(System.in);
        private Gym theGym;

        public static void main(String[] arg) { new Driver(); }

        public Driver() {
            runMenu();
        }
    private int mainMenu(){/*returns the option for the menu from the user*/}

    private void runMenu(){/*manages the menu*/}

    private void printGymMembers() {/*prints all the gym  members details*/}
    private void addGymMember() {/*gets the details from the users and calls the appropiate method in Gym class*/}
    private void printGymMembersOver56kg() {/*prints all the gym  members details whose weight >= 56 kg*/}
    private void printGymMembersTallestMember() {/*prints the gym  members that has greatest value for height*/}

    }
```

Skeleton Gym Code



```java
public class Gym {
    private GymMember[] members;
    int total = 0; //number of members that have been added to array

    public Gym(int numInGym) { members = new GymMember[numInGym]; }

    private boolean isFull() { return total == members.length; }

    private boolean isEmpty() { return total == 0; }


    public boolean add(GymMember member) {
        /*If there is space available, add the product object, passed as a parameter, to the array.*/}

    public int getTotal() {return total;}

    public void setTotal(int total) { /*setter for total.*/}

    public GymMember[] getMembers() {return members;}

    public void setMembers(GymMember[] members) {/*setter for members array.*/}

    public String listGymMembers() {/* This method builds and returns a String containing all the members in the array.*/ }
    public String listGymMembersOver56kg() {/* This method builds and returns a String containing all the members in the array over 56kg.*/ }
    public GymMember getGymMembersTallestMember() {/* This method builds and returns a String containing tallest member in the array.*/ }
```

Skeleton Gym Member Code



```java
public class GymMember {
    private String name = "Unknown";  //max 30 chars
    private double height = 0.0;   //in meters
    private double weight = 0.0;   //in kgs
    private int membershipNumber = 99999;  //between 00001 (incl) and 99999 (excl)
    private boolean isCurrentGymMember = false;
    public GymMember(String name, double height, double weight, int membershipNumber, boolean isCurrentGymMember) {
    }
    public String getName() { return name; }
    public void setName(String name) {         }
    public double getHeight() { return height; }
    public void setHeight(double height) {      }
    public double getWeight() { return weight; }
    public void setWeight(double weight) {   }
    public int getMembershipNumber() {}
    public void setMembershipNumber(int membershipNumber) {}
    public boolean isCurrentGymMember() {}
    public void setCurrentGymMember(boolean currentGymMember) { }
    @Override
    public String toString() {
        return name + ": " + height + "M, " + weight + "KG (Member Num: " + membershipNumber +
                ", current member: " + isCurrentGymMember + ")";
    }
}
```

Programming Fundamentals 1 – in-class test – Sample Test

Name	Student Number	Course

Instructions:

- **1.5 hour exam.**
- **3 Questions, answer all.**
- **Fill in your name, student number and course above.**
- **Complete the areas in this booklet and give it to your invigilator before leaving the room.**
- **Submit the section with your code as a complete booklet.**
- **You can write anywhere in this booklet and use the back of pages for additional code, rough work, etc.**

With this exam, you are given class diagram
for the classes:

- **Driver**
- **Gym**
- **GymMember**

Which make up a Gym System.
You will be asked to write code for the following classes:

- GymMember
- Gym
- Driver

Question 1 – Gym Member Class:

Note: you do not have to define the fields or write the getters.

GymMember.java

```
//Code the the constructor, the setters and the toString() methods as
defined in the following boxes.

// You should implement the following validation rules :
// For the member name field, this should be a maximum of 20 characters.
// In the case of the constructor, names with more than 20 characters
// should be cut to the first 20 characters.
//(Hint : You can use the String method substring to help you)
// In the case of the setter, do not update the value if it is more than //20 chars long.

// For the membership number field, the valid values are between 100 and 999 //(inclusive)
. In the case of the constructor, if an invalid value is
// input, the default value of 999 should be used.
// In the case of the setter, do not update the value if it is outside
// the valid values.

// There is no validation needed for the isCurrentGymMember, height or weight fields.
```

1.1 Setters :

```
public void setName(String name) {// FILL IN CODE BELOW




}

public void setMembershipNumber(int membershipNumber)
{// FILL IN CODE BELOW




}
```

```
public void setCurrentGymMember(boolean currentGymMember)
{// FILL IN CODE BELOW



}
```

1.2 Constructor:

```
public GymMember(String name, double height, double weight, int
membershipNumber, boolean isCurrentGymMember) {

    //FILL IN THE CODE INCLUDING IMPLEMENTING VALIDATION RULES









}
```

1.3 toString()

```
public String toString() { // FILL IN CODE THAT RETURNS A STRING
//VERSION OF THE OBJECT









}
```

2. The class diagram has a Gym class. In this class, there is an array of member objects, defined as follows:

```
private GymMember[] members;
int total = 0; //number of members that have been added to array
```

Gym.java

// Code each method as defined in the comment in the following boxes.

2.1 – add(..)

```
// If there is space available, add the GymMember object, passed
as a parameter, to the array.
// parameter is gymMember which is a  GymMember object to be added
to the array.
// returns the  Status of the add; true for success, false for
fail.

public boolean add(GymMember gymMember) {  //FILL IN CODE BELOW









}
```

2.2 listGymMembers()

```
//The return type is String.
//  This method returns a list of the gym members stored in the
array
//  list. Each member should be on a new line and should be
//  preceded by the index number e.g.
//        0: Member A  ………
//        1: Member B ……
//  If there are no members stored in the array list, return a
// string  that contains "No Members in the Gym".

public String listGymMembers () {  // FILL IN CODE BELOW









}
```

2.3 listGymMembersOver56kg()

```
// This method builds and returns a String containing all the
// members in the array
// whose weight is over 56

// returns a String containing all the members in the array whose
// whose weight is over 56or
// "No members are heavier than 56kg", // if none in the array.
// If there are no members in the array, the returned String
// contains  "No Members in the Gym"

public String listGymMembersOver56kg () { FILL IN CODE BELOW









}
```

2.4 getGymMembersTallestMember()

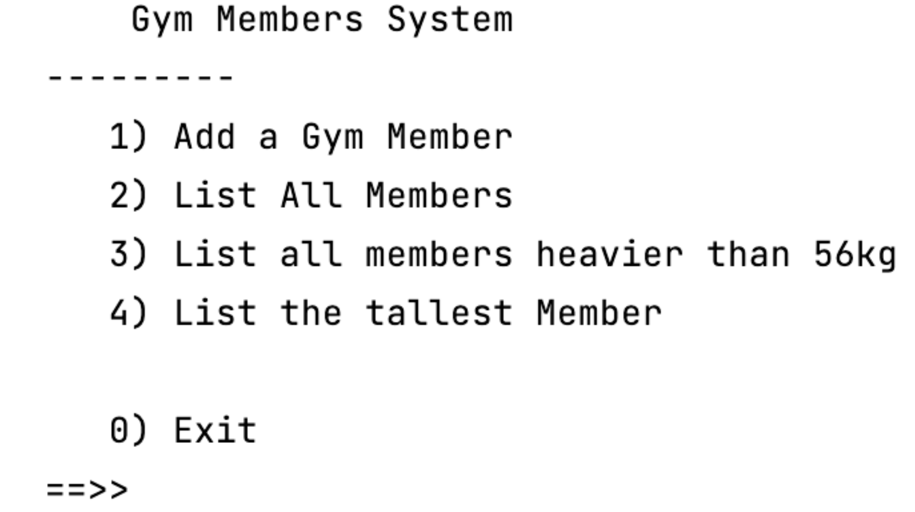
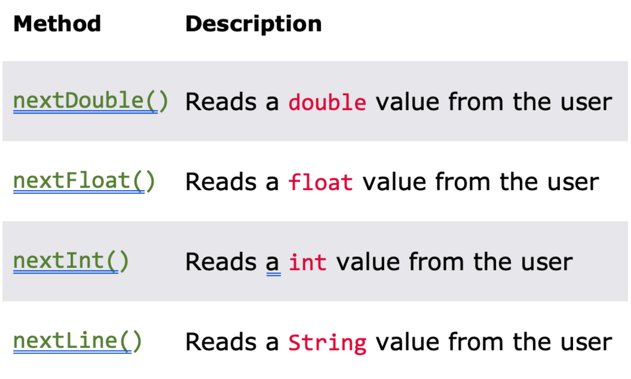
```
/** This method goes through the array of members and returns the
tallest member
 * . If no members exist in the array, null should be returned.
  */
public GymMember getGymMembersTallestMember (){//FILL IN CODE BELOW









}
```

Question 3: Driver:

The class diagram has a Driver class. In this class, there is an object of the Gym class.

public class Driver {

```
private Scanner input = new Scanner(System.in);
private Gym theGym;

public static void main(String[] arg) {
     new Driver();
}

public Driver() {
     runMenu();
}
```

This class displays the menu of options that the user can choose from:	 Gym Members System --------- 1) Add a Gym Member 2) List All Members 3) List all members heavier than 56kg 4) List the tallest Member 0) Exit ==>>
This class uses the Scanner class for reading from the console:	 **Method** **Description** nextDouble() Reads a double value from the user nextFloat() Reads a float value from the user nextInt() Reads a int value from the user nextLine() Reads a String value from the user

3.1 addGymMember()

In the following box, complete the code for the "Add a Gym Member" menu option. The add method that you will be calling in Gym has the following header:

```
private void addGymMember()
```

Driver.java

```
private void addGymMember(){

            // TODO Write the code to read in the data for a
            //      GymMember and add it to the Gym.

}
```