PECANWOOD

COLLEGE

Prepared for Life

INFORMATION TECHNOLOGY PRACTICAL JULY 2019
GRADE 11

NAME: With Memo **GRADE:** _____

DATE: 15 JULY 2019
MODERATOR: MR N NAINAR
EXAMINER: MR SC EILERTSEN

MARKS: 100
TIME: 180 MINUTES

INSTRUCTIONS:

1. This test is made up of 9 pages.
2. In addition there is a 2 page addendum. Please ensure that your paper is complete.
3. You may use a non-programmable calculator where relevant.
4. Login immediately and load the IDE you intend to use.
5. Print your Java code for section two and section three and hand it in with this question paper. You are responsible to ensure that your work is labelled correctly and handed in.
6. Note that there are no trick questions e.g. there are no deliberately missing semi colons, full stops or irrelevant spelling errors in the provided code examples – simple answer the question as stated.

Section One **Java – short questions.**

1.1) Answer the questions that followed after **carefully** studying the code snippet below.

Consider this code from a single class program

```
 5 public class RandomFlipper
 6 {
 7
 8    public static void main (String[]args)
 9    {
10       double myRandomDouble = Math.random();
11       System.out.println(myRandomDouble);
12
13       int myRandomInt = (int)(myRandomDouble);
14       System.out.println(myRandomInt);
15
16    }
17 }
```

1.1.1) Fully explain what line 10 does. The random method, part of the Math class, generates a random double number — from zero to one, but not including one. Variable is myRandomDouble (3)

1.1.2) If line 11 output the value 0.3886471590730, what value would line 14 output?

0 zero (1)

1.2) Answer the question that follows after **carefully** studying the code snippet below.

```
 5 public class RandomFlipper
 6 {
 7
 8    public static void main (String[]args)
 9    {
10       double myRandomDouble = Math.random();
11       System.out.println(myRandomDouble);
12
13       int myRandomInt = (int)(myRandomDouble);
14       System.out.println(myRandomInt * 100);
15
16    }
17 }
```

1.2.1) If line 11 output the value 0.3886471590730, what value would line 14 output?

0 zero (1)

1.3) Answer the question below after **carefully** studying the code snippet.

```
 5 public class RandomFlipper
 6 {
 7
 8    public static void main (String[]args)
 9    {
10       double myRandomDouble = Math.random();
11       System.out.println(myRandomDouble);
12
13       int myRandomInt = (int)(myRandomDouble * 100);
14       System.out.println(myRandomInt);
15
16    }
17 }
```

1.3.1) If line 11 output the value 0.3886471590730, explain how line 13 what affect this value.

Multiplies the random by 100 and then casts it to an int. ie 38 (1)

1.4) Answer the question below after **carefully** studying the code snippet.

```
 8    public static void main (String[]args)
 9    {
10       double myRandomDouble = Math.random();
11       System.out.println(myRandomDouble);
12
13       int myRandomInt = (int)(myRandomDouble * 100);
14       System.out.println(myRandomInt);
15
16       for (int i = 0; i < myRandomInt; i++)
17       {
18          System.out.print(i + " ");
19
20       }
21
22    }
23 }
```

1.4.1) If line 11 output the value 0.1486471590730, what would be the output of the loop in line 16 to line 18?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 (3)

numbers ✓
spacing ✓
On one line ✓

1.5) Answer the question below after **carefully** studying the code snippet.

```
 7
 8    public static void main (String[]args)
 9    {
10       double myRandomDouble = Math.random();
11       System.out.println(myRandomDouble);
12
13       int myRandomInt = (int)(myRandomDouble * 100);
14       myRandomInt = myRandomInt * -1; // multiplied by negative 1
15       System.out.println(myRandomInt);
16
17       for (int i = 0; i > myRandomInt; i--)
18       {
19          System.out.print(i + " ");
20
21       }
22
23    }
24 }
```

1.5.1) How would the loop behave (lines 17 to 21) if line 11 output the value 0.1676371596853?

0 −1 −2 −3 −4 −5 −6 −7 −8 −9 −10 −11 −12 −13 −14 −15

Loop counts downwards from zero down to −15 before stopping ✓ (3)

16

−16

1.6) Answer the questions that followed after studying the code below.

Consider the code below from two different classes that are part of the same package (not all the code is shown to save space) (the line numbers are for reference only as the two classes are each contained in two different files)

```
 1 public static void main(String[]args)
 2 {
 3
 4    int firstInt, secondInt, answer;
 5
 6    AcceptIntegers myIntegers = new AcceptIntegers();
 7    .
 8    .
 9    .
10    . answer = myIntegers.addIntegers(firstInt, secondInt);
11    .
12
13 public class AcceptIntegers
14 {
15    int first, second, total;
16                                5    8
17    public int addIntegers (int f, int s)
18    {
19       first = f;
20       second = s;
21       total = first + second;
22       return total;
23    }
```

1. 6.1) If the value of firstInt was 5, and secondInt was 8 (see line 4), what would be the value of "total" in line 22?

13 (1)

1.6.2) Explain fully how lines 10, line 17 and line 22 work together

Line 10 passes two arguments to the addIntegers method. ✓

Line 17 accepts these two integer parameters. ✓ (4)

Line 22 returns the answer of the two integers added together ✓

The answer is stored in variable "answer" ✓

Total for this question: (17)

Java coding – Object Orientated Programming
Creating a Template Class, Instantiation and Method Creation

2.1) You must code a two-class program that simulates the rolling of a 10 sided dice that allows the user to bet on "odds" or "evens". A 10-sided dice rolls numbers from 1 to 10. The result can be an odd number or an even number.

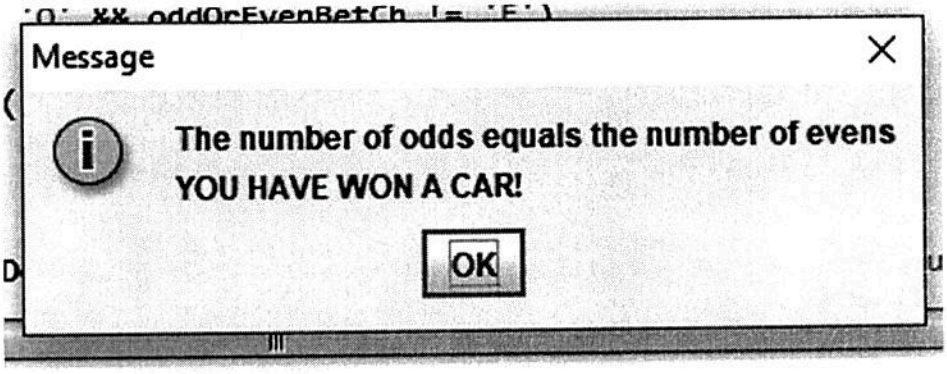
You are supplied with the UI class* – you have to code the corresponding template class that goes with the supplied class.

* A hardcopy "Addendum One" and an electronic copy,

The number of rolls is determined by the user from the keyboard. The number must be larger than **10 000**. The user is then asked to predict – more odd numbers or more even numbers? They are then asked to place a bet which they could lose or make more money depending on whether their prediction was correct or not.

The program then rolls the dice. It must then count the number of odd numbers versus the number of even numbers thrown. The program then declares the user a winner or loser depending on their prediction. If they lose, the user loses the amount that they bet. If their prediction is correct, the user doubles their money.

If the number of odds is equal to the number of evens (**a tie**), the user gets a special message and wins a car (see below)



You have been supplied with the DiceRollUI class that has the main method. There are two copies i.e. Addendum one and electronic. You must write the class that works with the DiceRollUI class that results in a working program.

Take careful note of the **use of comments** throughout the supplied DiceRollUI class – these comments are part of the exam question, and part of the exam paper, and must be read accordingly.

2.1.1) **Write the template class that accompanies the DiceRollUI class**. Your class must do the processing. This class must have **two methods**.

Study DiceRollUI for more detail.

You may alter the DiceRollUI class to suit your needs although this is not recommended.

Input – DiceRollUI - Supplied
Study Addendum One as supplied. Note of the use of comments throughout the DiceRollUI class.

Processing – Name this class, which you will create, to match the DiceRollUI class.

- You class must have two different methods. Name these methods to match the DiceRollUI class.
- The first method must generate the random numbers and count the number of odds and evens. It must then return the result i.e. "Odds, "Evens" or "Tie". (Did the class generate more odd numbers, more even numbers, or was the result a tie)
- The second method displays the special message if there is a tie between odds and evens. It declares that you have won a car. (28)

Output - DiceRollUI
Study Addendum One as supplied. Your template class must return the values needed so that the output lines 54 to 68 work correctly. Note that sample output is supplied with Addendum One.

Printing
Print **both** the DiceRollUI class and your own template class that you have written. Staple them together.

NOTE: Credit is given for good programming practice i.e.

1. Well-chosen variable names and correctly created package and class names.
2. Indentation and Comments.
3. Good use of whitespace to group code into useful sections. (4)

Total for this question: (32)

Section Three **Java Coding – Object Orientated Programming – Creating a Two Class Program**

3.1) Code a two-class program that can analyse an ID number using standard String handling methods. The class should output the person's first and last name, their gender, the province they were born in and age in complete years. It gets some of this information for analysing the supplied ID number from the keyboard.

The **ID number** structure is made up as follows . . . Example ID **9909017654243**

- Digits 1 and 2 is the year of birth. Example: "99" - that is 1999
- Digits 3 and 4 is the month of birth.
- Digits 5 and 6 is the day of birth.
- Digits 7,8,9 and 10 are viewed together. Example: "7654" - would be Female
    - From 0000 to 4999 – gender is Male.
    - From 5000 to 9999 – gender is Female.
- Digit 11 is the province of birth. Example: "2" would be North West Province (see below)
- Digit 12 and 13 is the city of birth.

The province digit can be any number from 0 to 9. The **Provinces** are allocated as follows . . .

- 0 – Unknown; 1 – Gauteng; 2 – North West Province; 3 – Mpumalanga; 4 – KwaZulu Natal; 5 – Eastern Cape; 6 – Western Cape; 7 – Northern Cape; 8 – Free State; 9 - Limpopo

More examples:

0503123432543 – This person was born in 2005, in the Eastern Cape and is Male.
8510097639954 – This person was born in 1985, in Limpopo and is Female.

Two Class Program

Your program must comprise of a UI class that handles input and output, as well as another class that does the processing via three different methods i.e.

1. determineGender – This method determines the gender from the ID number.
2. determineProvince – This method determines the province from the ID number.
3. determineAge.- This method determines the age from the ID number

Input – UI Class (23)

1. Accepts the person's name e.g. Luke Skywalker
2. Accepts the person's 13 digit ID number e.g. 1211056749821
3. Accepts the current year e.g. 2019

NOTE: **Name** must be **one** String. For this exam we will assume that all names are made up of two words. Using the String method indexOf( ), find the space character and separate the combined name into the first name and into the last name.

Processing – Create a template class (25)

- Three different methods.
    - The first method must determine their gender by analysing digits 7,8,9 and 10
    - The second method must determine their province of birth by analysing digit 11
    - The third method must determine the person' age by subtracting digit 1 and 2 from the current year. E.g. 2019 – 98 (i.e. 1998) = 21 years old (this method requires some thought and some logic)

Output – UI Class

Your template class must return the values and information to the UI class which must output the information to screen. See examples overleaf.

Sample Output
Your output must look like this - using the current year of 2019

```
 ----jGRASP exec: java sectiontwo.IDNumberUI
First Name: LUKE
Last Name: SKYWALKER
ID: 8611123425743
========================
Gender: Male
Province: Northern Cape
Age: 33

 ----jGRASP: operation complete.

 ----jGRASP exec: java sectiontwo.IDNumberUI
First Name: PRINCESS
Last Name: LEIA
ID: 8803127643367
========================
Gender: Female
Province: Mpumalanga
Age: 31

 ----jGRASP: operation complete.
```

Printing
Print both the UI class and your own template class with your name and grade in the comments section.

NOTE: Credit is given for good programming practice i.e.

1. Well-chosen variable names and correctly created package and class names.
2. Indentation and Comments.
3. Good use of whitespace to group code into useful sections. (3)

Total for this question: (51)

TOTAL: 100

Addendum One Memo P1

```
1 /* Write a two class program that simulates the rolling of a 10 sided dice that allow
2 * the users to bet on odds or evens. A 10-sided dice rolls numbers from 1 to 10.
3 *
4 * The number of rolls is determined by the user from the keyboard. The number must be
5 * bigger than 10 000. The user is asked to . . .
6 * bet whether the program will roll more odd numbers than even numbers.The program then
7 * rolls the dice.It must then count the number of odd numbers thrown versus the number
8 * of even numbers thrown. The progam then declares the user a winner or loser. If they loose,
9 * the users looses the amount that they bet. If they won, the users double their money.
10 * If the number of odds and evens is equal (tie), they win they jackpot prize of a new car */
11
12 // package julyexam2019;
13
14 import javax.swing.JOptionPane;
15
16 public class DiceRollUI
17 {
18
19    public static void main(String[]args)
20    {
21       //DECLARATIONS
22       int odd = 0, even = 0;
23       String numberOfRollsSt;
24       int numberOfRolls = 0;
25       double amount;
26       String winnerOddEven = null;
27       String oddOrEvenBetSt = null;
28       char oddOrEvenBetCh = 'z';
29
30       DiceRoll myDiceRoll = new DiceRoll();
31
32       //INPUT
33       numberOfRollsSt = (JOptionPane.showInputDialog("How many times must the dice be rolled?
"));
34       numberOfRolls = Integer.parseInt(numberOfRollsSt);
35
36       // Number of rolls must exceed 10 000
37       if (numberOfRolls < 1)
38       {
39          System.out.println("Error with number of rolls");
40          System.exit(0); // Program exits due to input error from keyboard.
41       }
42
43       // Ensure correct input from keyboard. "O" for odd and "E" for even.
44       oddOrEvenBetSt = (JOptionPane.showInputDialog("Bet on Odds or Evens? O/E"));
45       oddOrEvenBetSt = oddOrEvenBetSt.toUpperCase();
46       oddOrEvenBetCh = oddOrEvenBetSt.charAt(0);
47       if (oddOrEvenBetCh != 'O' && oddOrEvenBetCh != 'E')
48       {
49          System.out.println("Error with odd or even input.");
50          System.exit(0); // Program exits.
51       }
52
53       amount = Double.parseDouble(JOptionPane.showInputDialog("How much do you want to bet?")
);
54
55       //PROCESSING
56       winnerOddEven = myDiceRoll.diceRoll(numberOfRolls);
57
58       // Convert Odd, Even or Tie to "O", "E" or "T"
59       char winnerOddEvenCh = 'z';
60       if (winnerOddEven.equals("Even"))
```

supplied

Use a small number like 4 for testing.

Addendum One (cont) Memo p2

```
61          winnerOddEvenCh = 'E';
62
63       else if (winnerOddEven.equals("Odd"))
64          winnerOddEvenCh = 'O';
65
66       else if (winnerOddEven.equals("Tie"))
67          winnerOddEvenCh = 'T';
68
69       // OUTPUT
70       System.out.println("The number of rolls was " + numberOfRolls);
71       System.out.println("The winner is " + winnerOddEven);
72       System.out.println("You bet on " + oddOrEvenBetSt);
73
74      // Check for winning status. Bet matches the result
75      if (oddOrEvenBetCh == winnerOddEvenCh)
76      {
77          System.out.println("You are a winner!");
78          System.out.println("You have doubled your money " + (amount * 2));
79      }
80
31      // Check for loosing status. Bet does not match the result
82      else if (oddOrEvenBetCh != winnerOddEvenCh && winnerOddEvenCh != 'T')
83      {
84          System.out.println("You are a loser!");
85          System.out.println("You have lost " + amount);
86      }
87
88      // Check for a tie. If result is a tie, special message winning a car
89      else if (winnerOddEvenCh == 'T')
90      {
91          myDiceRoll.winningMessage();
92      }
93
94    } // end main
95 }
96
```

SAMPLE OUTPUT

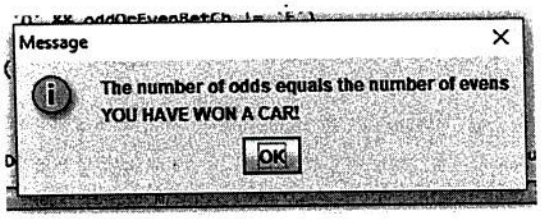
(A)

```
 ----jGRASP exec: java DiceRollUI
The number of rolls was 12001
The best you placed was 1000.0
The winner is Even
You bet on ODD
You are a loser!
You have lost 1000.0

 ----jGRASP: operation complete.
```

(B)

```
 ----jGRASP exec: java DiceRollUI
The number of rolls was 13002
The best you placed was 2000.0
The winner is Even
You bet on EVEN
You are a winner!
You have doubled your money 4000.0

 ----jGRASP: operation complete.
```

(C)



Memo p3

```
1 /* Write a two class program that simulates the rolling of a 10 sided dice that allow
2 * the users to bet on odds or evens. A 10-sided dice rolls numbers from 1 to 10.
3 *
4 * The number of rolls is determined by the user from the keyboard. The number must be
5 * bigger than 10 000. The user is asked to . . .
6 * bet whether the program will roll more odd numbers than even numbers.The program then
7 * rolls the dice.It must then count the number of odd numbers thrown versus the number
8 * of even numbers thrown. The progam then declares the user a winner or loser. If they loose,
9 * the users looses the amount that they bet. If they won, the users double their money.
10 * If the number of odds and evens is equal (tie), they win they jackpot prize of a new car */
11
12 // package julyexam2019;
13
14 import javax.swing.JOptionPane;
15
16 public class DiceRoll
17 {
18     private String winner = null;
19     private int numberOfRolls;
20     private int odd = 0, even = 0;
21
22     public String diceRoll(int n)
23     {
24         numberOfRolls = n;
25
26         for (int i = 0; i < numberOfRolls;i++)
27         {
28            double myDoubleRandom = Math.random();
29            int myIntegerRandom = (int)((myDoubleRandom * 10) + 1);
30
31            if (myIntegerRandom % 2 == 0)
32               even = even + 1;
33            else
34               odd = odd + 1;
35
36         } // end for
37
38         if (even > odd)
39            winner = "Even";
40         else if (even < odd)
41            winner = "Odd";
42         else if (even == odd)
43            winner = "Tie";
44
45         return winner;
46     }
47
48     public void winningMessage()
49     {
50         JOptionPane.showMessageDialog(null, "The number of odds equals the number of evens"
+ "\n" + "YOU HAVE WON A CAR!");
51     }
52
53 }
```

26/28

variables ✓
packages + classes ✓
indentation + commats ✓
White space ✓

26/4

Memo p 4

```
1 /* This 2 class program accepts your 13 digit ID number as input from the keyboard.
2 * It alos accept your first name, followed by your last name (combined name)
3 * Convert combined name in upper case letter only
4 * It also accepts the current year from the keyboard
5 * It rejects ID numbers that are too short or too long.
6 * It outputs to the console how old the person is.
7 * It outputs their gender.
8 * blah blah */
9
10 package sectiontwo;
11
12 import javax.swing.JOptionPane;
13
14 public class IDNumberUI
15 {
16
17    public static void main (String[]args)
18    {
19       // DECLARATION
20       IDAnalysis myIDAnalysis = new IDAnalysis();
21
22       String name = null;
23       String id = null;
24       String firstName, lastName;
25       int genderDigits;
26       int age = 0, currentYear = 0, birthYear = 0;
27       String gender;
28       int provinceDigits;
29       String province;
30
31       //INPUT
32       name = JOptionPane.showInputDialog("Enter your first name and last name" + "\n" + "Exam
ple: Luke Skywalker");
33       name = name.toUpperCase();
34       int spaceIndex = name.indexOf(" ");
35       firstName = name.substring(0, spaceIndex);
36       lastName = name.substring(spaceIndex + 1);
37
38       id = JOptionPane.showInputDialog("Enter your 13 digit ID number");
39       if (id.length() != 13)
40       {
41          System.out.println("Error");
42          System.exit(0); // Exit program due to input error.
43       }
44
45       currentYear = Integer.parseInt(JOptionPane.showInputDialog("Enter the current year."));
46
47       //PROCESSING
48       // Determine gender
49       genderDigits = Integer.parseInt(id.substring(6,10));
50       System.out.println(genderDigits);
51       gender = myIDAnalysis.determineGender(genderDigits);
52
53       // Determine province of birth
54       provinceDigits = Integer.parseInt(id.substring(10,11));
55       System.out.println("xxx" + provinceDigits);
56       province = myIDAnalysis.determineProvince(provinceDigits);
57
58       // Determine age
59       birthYear = Integer.parseInt(id.substring(0,2));
60       System.out.println("birthyear: " + birthYear);
61       age = myIDAnalysis.determineAge(currentYear, birthYear);
```

Memo P5

```
62
63        //OUTPUT
64        System.out.println("First Name: " + firstName);
65        System.out.println("Last Name: " + lastName);
66        System.out.println("ID: " + id);
67        System.out.println("Province: " + province);
68        System.out.println("Gender: " + gender);
69        System.out.println("Age: " + age);
70
71    }
72
73 }
```

✓ ✓ ✓

x/23

Memo P6

```
1  // comment
2
3  package sectiontwo;
4
5  public class IDAnalysis
6  {
7     private int genderDigits;
8     private String gender;
9     private int provinceI;
10    String provinceSt;
11    private int age;
12
13    public String determineGender(int gd)
14    {
15       genderDigits = gd;
16
17       if (genderDigits >= 0000 && genderDigits <= 4999)
18          gender = "Male";
19       if (genderDigits >= 5000 && genderDigits <= 9999)
20          gender = "Female";
21
22       return gender;
23
24    }
25
26    public String determineProvince(int p)
27    {
28       provinceI = p;
29
30       if (provinceI == 0)
31          provinceSt = "Unknown";
32
33       if (provinceI == 1)
34          provinceSt = "Gauteng";
35
36       if (provinceI == 2)
37          provinceSt = "North West Province";
38
39       if (provinceI == 3)
40          provinceSt = "Mpumalanga";
41
42       if (provinceI == 4)
43          provinceSt = "KwaZulu Natal";
44
45       if (provinceI == 5)
46          provinceSt = "Eastern Cape";
47
48       if (provinceI == 6)
49          provinceSt = "Western Cape";
50
51       if (provinceI == 7)
52          provinceSt = "Northern Cape";
53
54       if (provinceI == 8)
55          provinceSt = "Free State";
56
57       if (provinceI == 9)
58          provinceSt = "Limpopo";
59
60       return provinceSt;
61    }
62
```

Memo P7

```
63    public int determineAge(int cy, int by)
64    {
65       int currentYear = cy;
66       int birthYear = by;
67
68       if (birthYear == 1 || birthYear == 2 || birthYear == 3 || birthYear == 4 || birthYear =
= 5 || birthYear == 6 || birthYear == 7 || birthYear == 8 || birthYear == 9 || birthYear == 10 |
| birthYear == 11| birthYear == 12 || birthYear == 13 || birthYear == 14 || birthYear == 15 || b
irthYear == 16 || birthYear == 17 || birthYear == 18)
69          birthYear = birthYear + 2000;
70       else
71          birthYear = birthYear + 1900;
72
73       age = currentYear - birthYear;
74
75       return age;
76
77    }
78
79 }
```

x/25

* Or switch case statement

packages and classes and variables

indentation + whitespace

comments

x/3