Faculty of Information Technology		
I declare that I am familiar with, and will abide to the Examination rules of CTU	**SUBJECT NAME: Beginner Java** **SUBJECT CODE: JD521**	
	Formative Assessment 4 **Duration**: **Date**: **Total Marks: 80** **Total pages: 22**	**Examiner: Lindeka Mntambo and Junior Manganyi** **Moderator:**
Monde _____ **Signature**	**Student number**	

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Surname: **Mkhize**	**Initials**: ME	/	%

Contents

Formative Assessment 4

Practical Question(s) 80 Marks

Question 1:

1.1 Palindrome is a word, verse, or sentence (such as "Able was I ere I saw Elba") or a number (such as 1881) that reads the same backward or forward. Create a Java application to check if a number provided by the user is a Palindrome or not. Give appropriate messages to the user. See sample output: [20 Marks]

```
Please give the input number to check palindrome:
121
Input By User:121
Reverse number:121
121 is a Palindrome Number
```

Save the file as PalindromeYourName.java.

Code:

```java
// Import scanner object
import java.util.Scanner;


public class PalindromeMonde {

    public static void main(String[] args) {

        boolean isRunning = true;

        // Program loop
        while(isRunning)
        {
            // Create the scanner object
            Scanner scanner = new Scanner(System.in);

            // Prompt the user for integer input
            System.out.println("Please give the input number to check palindrome:");

            // Declare variables
            long number = 0;
            boolean isValidInput = false;

            // While loop for validation
            while (!isValidInput) {
                // Try catch block if the user does not enter an integer value
                try {
                    String input = scanner.nextLine();
                    if (input.isEmpty()) {
```

```java
                System.out.println("No input detected. Please enter an
integer:");

                continue;
            }
            number = Long.parseLong(input);
            isValidInput = true;
        }
        catch (NumberFormatException e) {
            System.out.println("\nInvalid input! Please enter an integer:");
        }
    }


    // Display the results
    System.out.println("\nInput By User: " + number);
    System.out.println("Reverse number: " + reverseNumber(number));


    if (isPalindrome(number)) {
        System.out.println("\n" + number + " is a Palindrome Number.");
    }
    else {
        System.out.println("\n" + number + " is not a Palindrome Number.");
    }


    boolean loop = true;


    // Loop to not end the program unless user says so
    while (loop){
        Scanner input = new Scanner(System.in);


        // Prompt user to continue or not
        System.out.println("\nWould you like to check another palindrome?
(y/n):");
```

```java
        char yesOrNo = input.next().charAt(0);

        if (yesOrNo == 'y') {

            System.out.print("\n");

            isRunning = true; // Continues main loop

            loop = false; // Ends current loop

        }

        else if (yesOrNo == 'n') {

            System.out.println("\nThank you for using the Palindrome checker!
");

            isRunning = false; // Ends main loop

            loop = false; // Ends current loop

        }

        else {

            System.out.print("\nIncorrect input. Please choose (y/n)!");

            loop = true; // Continues current loop

        }

      }

    }

  }


  // Method that verifies if the input is a palindrome or not

  private static boolean isPalindrome(long number) {

    return number == reverseNumber(number);

  }


  // Method that checks if the reverse string is equal to the original string

  private static long reverseNumber(long number) {

    long reversedNumber = 0;


    while (number != 0) {
```
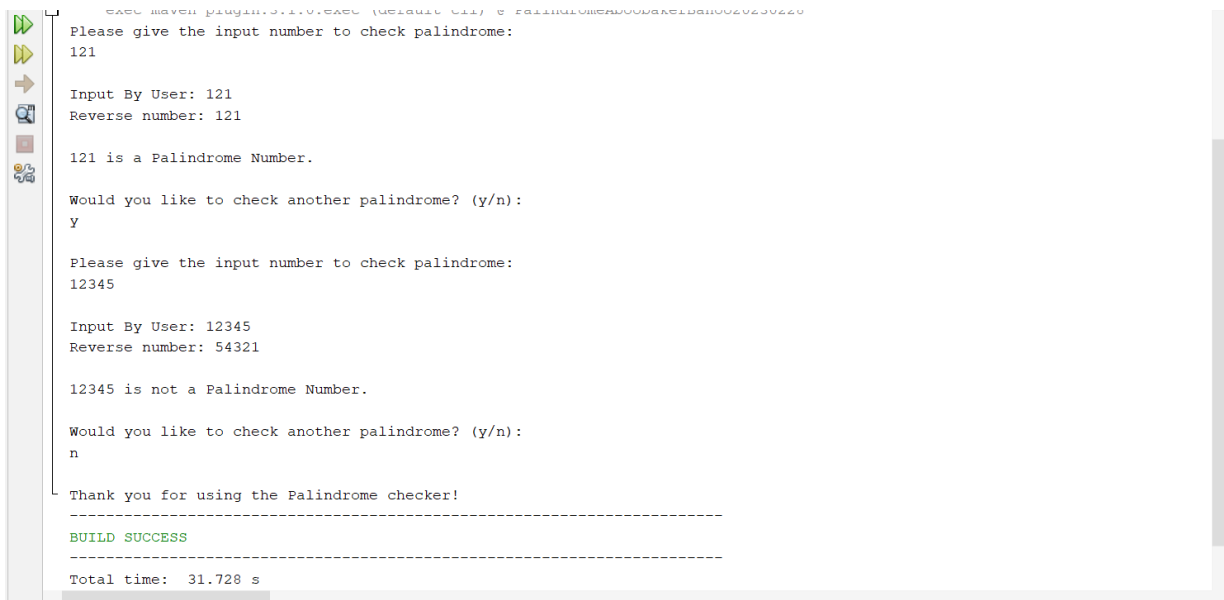
```
            long remainder = number % 10;

            reversedNumber = reversedNumber * 10 + remainder;

            number /= 10;

        }

        return reversedNumber;

    }

}
```

Screenshots of the output:

```
exec maven plugin.3.1.0.exec (default cli) @ PalindromeADUUBakerBan00230228
Please give the input number to check palindrome:
121

Input By User: 121
Reverse number: 121

121 is a Palindrome Number.

Would you like to check another palindrome? (y/n):
y

Please give the input number to check palindrome:
12345

Input By User: 12345
Reverse number: 54321

12345 is not a Palindrome Number.

Would you like to check another palindrome? (y/n):
n

Thank you for using the Palindrome checker!
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  31.728 s
```

1.2 Create a lottery game application. Generate three random numbers, each between 0 and 9. Allow the user to guess three numbers. [30 Marks]

Compare each of the user's guesses to the three random numbers and display a message that includes the user's guess, the randomly determined three-digit number, and the amount of money the user has won as follows:

Matching Numbers	Award ($)
Any one matching	10
Two matching	100
Three matching, not in order	1,000
Three matching in exact order	1,000,000
No matches	0

Make certain that your application accommodates repeating digits. For example, if a user guesses 1, 2, and 3, and the randomly generated digits are 1, 1, and 1, do not give the user credit for three correct guesses—just one.

Save the file as LotteryYourName.java.

```
Lottery (debug) ×    Debugger Console ×    Lottery (run) ×
run:
Please enter your first guess:
8
Please enter your second guess:
9
Please enter your third and final guess:
1
2 6 5
You have won: $0
BUILD SUCCESSFUL (total time: 46 seconds)
```

```
Lottery (debug) ×    Debugger Console ×    Lottery (run) ×
run:
Please enter your first guess:
2
Please enter your second guess:
4
Please enter your third and final guess:
6
0 8 6
You have won: $10.0
BUILD SUCCESSFUL (total time: 6 seconds)
```

```
Lottery (debug) ×    Debugger Console ×    Lottery (run) ×
run:
Please enter your first guess:
2
Please enter your second guess:
2
Please enter your third and final guess:
3
2 5 3
You have won: $100.0
BUILD SUCCESSFUL (total time: 3 seconds)
```

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Code:

```java
// Import statements

import java.util.Scanner;

import java.util.Random;


public class LotteryMonde {


    public static void main(String[] args) {

        // Call the playLotteryGame method

        playLotteryGame();

    }


    private static void playLotteryGame() {

        Random random = new Random(); // Create random object

        Scanner scanner = new Scanner(System.in); // Create scanner object


        // Generate three random numbers between 0 and 9

        int digit1 = random.nextInt(10);

        int digit2 = random.nextInt(10);

        int digit3 = random.nextInt(10);


        // Prompt the user & Display the results

        System.out.println("Welcome to the Lottery Game! Lets begin!");

        System.out.print("\nEnter your first guess (between 0 and 9): ");

        int guess1 = readGuess(scanner);

        System.out.print("Enter your second guess (between 0 and 9): ");

        int guess2 = readGuess(scanner);

        System.out.print("Enter your third and final guess (between 0 and 9): ");

        int guess3 = readGuess(scanner);


        System.out.println("\nLottery Result: " + digit1 + " " + digit2 + " " +
digit3);
```

```java
        int winnings = calculateWinnings(guess1, guess2, guess3, digit1, digit2,
digit3);


        System.out.println("Your guesses: " + guess1 + " " +  guess2 + " " +
guess3);
        System.out.println("Winnings: $" + winnings);


        // Loop to ask the user to play again
        boolean play  = true;


        while (play) {
            System.out.print("\nDo you want to play again? (y/n): ");
            String playAgain = scanner.next();


            if (playAgain.equalsIgnoreCase("y")) {
                System.out.println();
                play = false;
                playLotteryGame();
            }
            else if (playAgain.equalsIgnoreCase("n")) {
                System.out.println("\nThank you for playing. Have a good day!");
                play = false;
            }
            else {
                System.out.println("Incorrect Input! Please choose y/n");
                play = true;
            }
        }
    }


    // Validate the users guesses
```

```java
    private static int readGuess(Scanner scanner) {

      while (true) {

        try {

          int guess = scanner.nextInt();


          if (guess < 0 || guess > 9) {

            System.out.print("Invalid guess. Enter a number between 0 and 9: ");

          }

          else {

            return guess;

          }

        } catch (Exception e) {

          System.out.print("Invalid input. Enter a number between 0 and 9: ");

          scanner.next(); // Clear the input buffer

        }

      }

    }


    private static int calculateWinnings(int guess1, int guess2, int guess3, int digit1, int digit2, int digit3) {

      int winnings = 0;


      String guess = String.format("%d%d%d",guess1, guess2, guess3);

      String winningCombo = String.format("%d%d%d",digit1, digit2, digit3);


      // Simplest case: guess is exactly winning combination

      if (guess.equals(winningCombo)) {

        winnings = 1000000;

      }

      else {

        int matching = 0;
```

```java
        //Iterate over the characters of the guess. Increment for each one found
in the winning combination
        for (int i=0; i < guess.length(); i++) {

            //If winning combination contains this character

            if (winningCombo.contains( guess.charAt(i) + "")) {

            matching++;


            //Remove the character from the winnning combination to avoid
duplication issues

            int slicePoint = winningCombo.indexOf(guess.charAt(i));

            winningCombo = winningCombo.substring( 0, slicePoint) +
winningCombo.substring(slicePoint + 1);

            }

        }


    //Return winnings based on number of matches
        switch (matching) {
          case 0:
            winnings = 0;
            break;
          case 1:
            winnings = 10;
            break;
          case 2:
            winnings = 100;
            break;
          case 3:
            winnings = 1000;
            break;
        }
    }
```
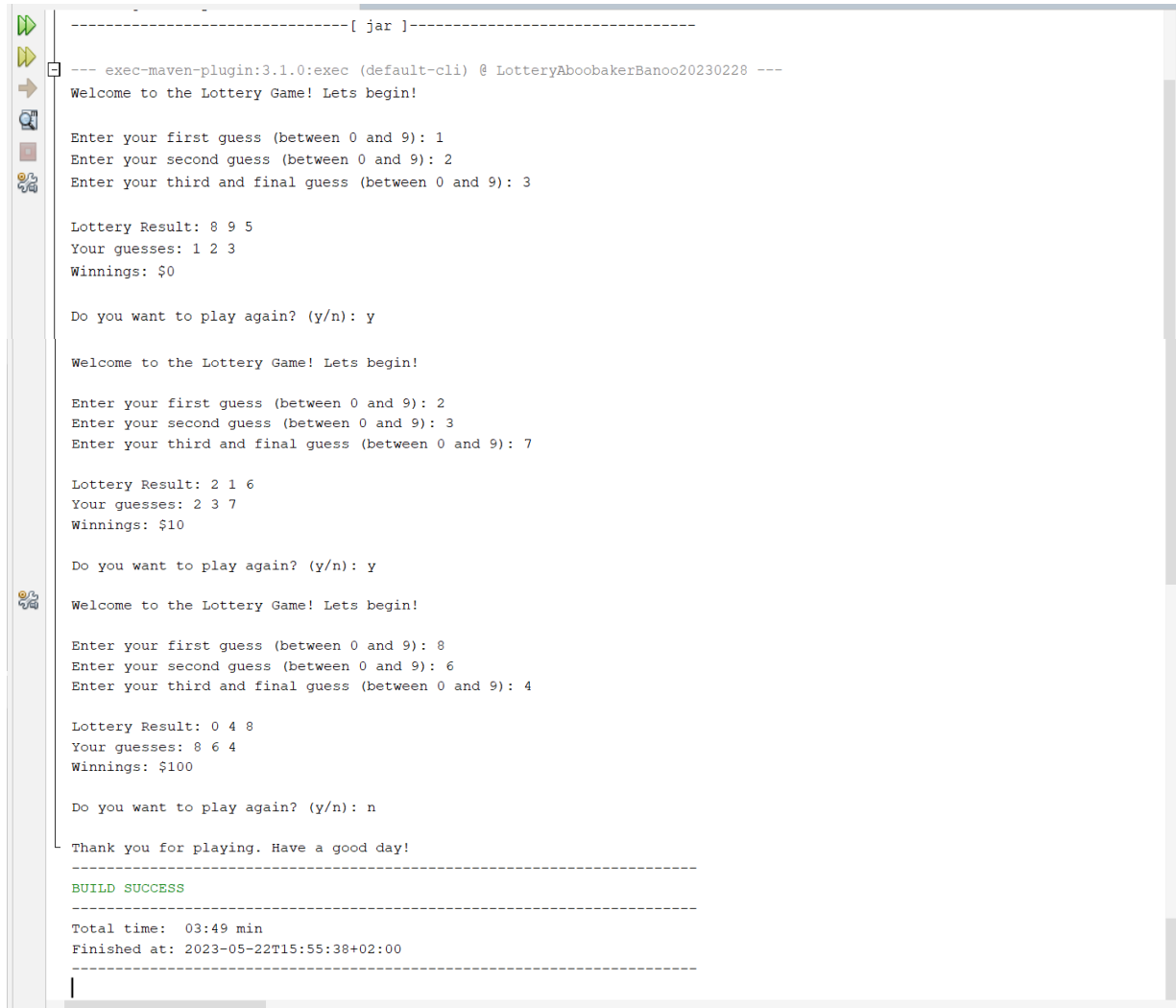
```
    return winnings;

  }

}
```

Screenshots of the output:

```
------------------------------[ jar ]---------------------------------
--- exec-maven-plugin:3.1.0:exec (default-cli) @ LotteryAboobakerBanoo20230228 ---
Welcome to the Lottery Game! Lets begin!

Enter your first guess (between 0 and 9): 1
Enter your second guess (between 0 and 9): 2
Enter your third and final guess (between 0 and 9): 3

Lottery Result: 8 9 5
Your guesses: 1 2 3
Winnings: $0

Do you want to play again? (y/n): y

Welcome to the Lottery Game! Lets begin!

Enter your first guess (between 0 and 9): 2
Enter your second guess (between 0 and 9): 3
Enter your third and final guess (between 0 and 9): 7

Lottery Result: 2 1 6
Your guesses: 2 3 7
Winnings: $10

Do you want to play again? (y/n): y

Welcome to the Lottery Game! Lets begin!

Enter your first guess (between 0 and 9): 8
Enter your second guess (between 0 and 9): 6
Enter your third and final guess (between 0 and 9): 4

Lottery Result: 0 4 8
Your guesses: 8 6 4
Winnings: $100

Do you want to play again? (y/n): n

Thank you for playing. Have a good day!
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  03:49 min
Finished at: 2023-05-22T15:55:38+02:00
------------------------------------------------------------------------
```

1.3 Write a Java console application for an Exam Entrance Calculator that allows a user to input the name of a module and the marks obtained in its three formative assessments (each worth 16.66%). The application should then calculate the student's semester mark and output whether the student has qualified to write the exam or not. Use constants to store the weight of each assessment. The pass mark for the module to write and exam is 30%.

[30 Marks]

Use the following examples to achieve your App:

If a user has the following marks:

FA1 = 65%

FA2= 34%

FA3 = 25%

You need to convert the mark received to the weight of the assessments.

FA1 = 65 / 100 * 16.66

FA2 = 34 / 100 * 16.66

FA3 = 25 / 100 * 16.66

These should be your implementation.

Calculations: Assuming you have a variable name as follows:

finalMark: FA1 + HA2 + FA3

Then use the final mark to determine if the student has qualified or not.

Your application should display the following prompts to the user:

"Please enter the name of the module: "

"Please enter the mark for Formative Assessment 1 (out of 100): "

"Please enter the mark for Formative Assessment 2 (out of 100): "

"Please enter the mark for Formative Assessment 3 (out of 100): "

Assume that the user enters valid integer marks for each assessment.

Display an appropriate message for the two conditions, if the student gets 30% or more display "Congratulations you have qualified to write an exam" if not "You did not meet the qualifying criteria, you have failed your module"

Code:

```java
// Import statements
import java.util.Scanner;
import java.util.InputMismatchException;

public class ExamEntranceCalculator {
    // Declare constants
    private static final double ASSESSMENT_WEIGHT = 16.66;
    private static final double PASS_MARK = 30.0;

    public static void main(String[] args) {
        boolean isRunning = true;

        // Main program loop
        while(isRunning)
        {
            // Create scanner object
            Scanner scanner = new Scanner(System.in);

            // Prompt user for the name of the module
            System.out.print("Please enter the name of the module: ");
            String moduleName = scanner.nextLine();

            // Prompt user for the formative marks
            double fa1Mark = getValidMark(scanner, "\nPlease enter the mark for Formative Assessment 1 (out of 100): ");

            double fa2Mark = getValidMark(scanner, "Please enter the mark for Formative Assessment 2 (out of 100): ");

            double fa3Mark = getValidMark(scanner, "Please enter the mark for Formative Assessment 3 (out of 100): ");
```

```java
// Calculations for all the marks
double fa1Weight = fa1Mark / 100.0 * ASSESSMENT_WEIGHT;
double fa2Weight = fa2Mark / 100.0 * ASSESSMENT_WEIGHT;
double fa3Weight = fa3Mark / 100.0 * ASSESSMENT_WEIGHT;


double semesterMark = fa1Weight + fa2Weight + fa3Weight;


// Convert the semesterMark to two decimal places
String formattedSemesterMark = String.format("%.2f", semesterMark);


// Display the results
System.out.println("\nModule: " + moduleName);
System.out.println("Semester Mark: " + formattedSemesterMark);


if (semesterMark >= PASS_MARK) {
    System.out.println("\nCongratulations, you have qualified to write an exam!");
} else {
    System.out.println("\nYou did not meet the qualifying criteria, you have failed your module!");
}


boolean loop = true;


// Loop to not end the program unless user says so
while (loop){
    // Create scanner object
    Scanner input = new Scanner(System.in);


    // Prompt the user if they would like to calculate another module mark
```

```java
            System.out.println("\nWould you like to calculate another module
mark? (y/n)");


            char yesOrNo = input.next().charAt(0);

            if (yesOrNo == 'y') {

                System.out.print("\n");

                isRunning = true; // Continues main loop

                loop = false; // Ends current loop

            }

            else if (yesOrNo == 'n') {

                System.out.println("\nThank you for using the exam entrance
calculator! ");

                isRunning = false; // Ends main loop

                loop = false; // Ends current loop

            }

            else {

                System.out.println("\nIncorrect input. Please choose y/n! ");

                loop = true; // Continues current loop

            }

        }

      }

    }


    // Helper method to validate the mark input (Validation)

    private static double getValidMark(Scanner scanner, String prompt) {

        // Declare variables

        double mark = 0;

        boolean validInput = false;


        // Continue prompting until a valid mark is entered

        do {

            try {
```

```java
        System.out.print(prompt);

        mark = scanner.nextDouble();


        // Check if the mark is within the valid range of 0 to 100

        if (mark >= 0 && mark <= 100) {

            validInput = true;

        }
        else {

            System.out.println("\nInvalid mark. Please enter a number between 0 and 100!");

        }
      } catch (InputMismatchException e) {

        System.out.println("\nInvalid input. Please enter a valid number!");

        scanner.nextLine(); // Clear the input buffer

      }
    } while (!validInput);


    return mark;
  }
}
```

Screenshots of the output:

```
Output - Run (ExamEntranceCalculator) ×

--- exec-maven-plugin:3.1.0:exec (default-cli) @ ExamEntranceCalculator ---
Please enter the name of the module: PRG521

Please enter the mark for Formative Assessment 1 (out of 100): 85
Please enter the mark for Formative Assessment 2 (out of 100): 90
Please enter the mark for Formative Assessment 3 (out of 100): 75

Module: PRG521
Semester Mark: 41,65

Congratulations, you have qualified to write an exam!

Would you like to calculate another module mark? (y/n)
y

Please enter the name of the module: JD521

Please enter the mark for Formative Assessment 1 (out of 100): 65
Please enter the mark for Formative Assessment 2 (out of 100): 34
Please enter the mark for Formative Assessment 3 (out of 100): 25

Module: JD521
Semester Mark: 20,66

You did not meet the qualifying criteria, you have failed your module!

Would you like to calculate another module mark? (y/n)
n

Thank you for using the exam entrance calculator!
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  43.483 s
Finished at: 2023-05-22T16:01:18+02:00
------------------------------------------------------------------------
```

Completed Declaration of Authenticity

I _____ hereby
(Monde Mkhize and group members)
declare that the contents of this assignment JD521-FA4 is entirely my own work except for the
following documents: (List the documents and page numbers of work in this portfolio
that were generated in a group)

Activity	Date
Aboobaker Banoo – 20230228	18 May 2023
Dillan Singh – 20232233	18 May 2023
Kiandra Padayachee – 20230491	16 May 2023
Michaeleah-Anne Murray – 20231805	16 May 2023
Monde Mkhize – 20231733	16 May 2023
Ofentse Senakgomo – 20230492	17 May 2023
Tanyaradwa Matope – 20231120	15 May 2023
Tracey-Lee Swartz - 20230171	16 May 2023
Vhuhone Adore Shavhani – 13311	18 May 2023

Signature: Date: _____22 May 2023_____

Monde