

QUESTION 2

a) Given the following program.

```
import java.util.Stack;
import java.util.Scanner;

class PalindromeTest {

    public static void main(String[] args) {

        Stack stack = new Stack();

        for (int j = 0; j < 5; j++) {

            System.out.print("Enter any string:");
            Scanner in=new Scanner(System.in);
            String inputString = in.nextLine();

            for (int i = 0; i < inputString.length(); i++) {

                stack.push(inputString.charAt(i));
            }

            String reverseString = "";

            while (!stack.isEmpty()) {

                reverseString = reverseString+stack.pop();
            }

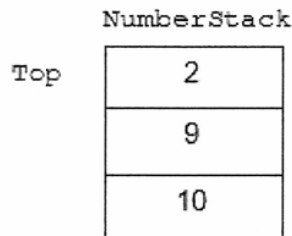
            if (inputString.equals(reverseString))
                System.out.println("A palindrome.");
            else
                System.out.println("Not a palindrome.");
        }
    }
}
```

i) What are the output if the following data are used as the input of the program?

```
kakak
susu
123321
apa
ok
```

(5 marks)

- ii) Given a stack named `NumberStack` as shown in the following diagram, write a program segment to move all odd numbers into `oddStack` and even numbers into `evenStack`. Then draw stack diagrams for `oddStack` and `evenStack` if the program segment is to be executed. Label the top of the stacks respectively.



(5 marks)

- iii) Given the following PRU15 and Stack ADT.

```

public class PRU15 {
    private String candidateName;
    private int candidateAge;
    private char candidateMedicalReport; // H-Healthy, R-Risk
    private String partyName;
    private String parliamentCode; // P1 Padang Besar, P63 Tambun,
                                   P135 Alor Gajah, etc
    //constructors
    //setters
    //getters
    //printer
}

public class Stack {
    public void push( Object elem);
    public Object pop();
    public boolean isEmpty();
}

```

Assume that all data have been inserted into a stack called `PRU15Stack`.

Move the candidate whose age is more than 95 years old and the medical report is in the risk category into `oldStack`, otherwise move the candidate into `tempStack`. Move all data from `tempStack` back into `PRU15Stack`.

(5 marks)

b) Answer the following questions.

i) Convert the following infix to prefix notation:

$$A - B / (C * D \$ E) + F$$

$$(G + H) * (J - K) / L \$ M$$

(5 marks)

ii) Convert the following infix to postfix notation:

$$A - B / (C * D \$ E) + F$$

$$(G + H) * (J - K) / L \$ M$$

(5 marks)

c) Answer the following questions.

i) Convert the following expression into postfix and show the steps using stack configuration,

$$T \$ E * R - O + K / A$$

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(5 marks)

ii) Evaluate the postfix expression in c (i) using stack configuration if the given values are as follows:

$$T = 1, E = 2, R = 3, O = 4, K = 10 \text{ and } A = 2.$$

(10 marks)

QUESTION 3

Answer the following questions.

a) Given an arithmetic expression as follows:

$$p / q + r * r / (s + u)$$

i) Draw the expression tree of the given arithmetic expression. Then write the postorder and preorder traversals.

(5 marks)