Name: Sumukh Raju Bhat	SRN: PES1UG19CS519	Section H
	Date: 9/2/2022	Week Number:02

Problem Statement:

1. Define an abstract class TestQuestion that has a String data variable called question and a readQuestion abstract method.
2. Define three subclasses ShortAnswer, LongAnswer and MCQ. The subclasses should have the following data variables in addition to the question, ShortAnswer (numLines – by default set to 1), LongAnswer (numLines) and MCQ(numChoices, array of String for the choices)
3. The three subclasses define the readQuestion method as follows: a. ShortAnswer would read the question from standard input (keyboard) and also sets the numLines to 1 by default. b. LongAnswer would read the question and numLines from standard input (keyboard) c. MCQ would read the question, numChoices and choices from standard input (keyboard)
4. Write the toString method for each of the subclasses to display the details
5. The main method in TQManager class should contain an array of TestQuestions that references any type of subclasses. In the main function, the user chooses to create a question of a specific type and accordingly an instance is created and a reference is assigned in the array and the readQuestion method is invoked. Thereafter, display all the questions by implicitly invoking the toString method.

Code:

```
import java.util.Scanner;

abstract class TestQuestion {
   String question;

   public abstract void readQuestion();
}

class ShortAnswer extends TestQuestion {
   int numLines = 1;
```

```
    public String toString() {
        return "Question: " + this.question + "\nNumber of Lines: " +
numLines;
    }

    @Override
    public void readQuestion() {
        System.out.println("Enter the question");
        Scanner sc = new Scanner(System.in);
        String q = sc.nextLine();
        question = q;
    }
}

class LongAnswer extends TestQuestion {
    int numLines;

    public String toString() {
        return "Question: " + this.question + "\nNumber of Lines: " +
numLines;
    }

    @Override
    public void readQuestion() {
        System.out.println("Enter the number of lines: ");
        Scanner sc = new Scanner(System.in);
        numLines = sc.nextInt();
        System.out.println("Enter the Question: ");
        Scanner sc1 = new Scanner(System.in);
        question = sc1.nextLine();
    }
```

```
}

class MCQ extends TestQuestion {
    int numChoice;
    String choices[];

    @Override
    public void readQuestion() {
        System.out.println("Enter the number of choices: ");
        Scanner sc = new Scanner(System.in);
        numChoice = sc.nextInt();
        String[] temp = new String[numChoice];
        System.out.println("Enter the question");
        Scanner sc1 = new Scanner(System.in);
        question = sc1.nextLine();
        for (int i = 0; i < numChoice; ++i) {
            System.out.println("Enter choice# " + (i + 1));
            Scanner sc2 = new Scanner(System.in);
            temp[i] = sc2.nextLine();
        }
        choices=temp;
    }

    public String toString() {
        String res = "";
        res += "Number of Choices: " + this.numChoice + "\n";
        res += "Question: " + this.question + "\n";
        for (int i = 0; i < numChoice; ++i) {
            res += (choices[i] + "\n");
        }
        return res;
```

```
    }

}

class TQManager {
    public static void main(String[] args) {
        System.out.println("SRN: PES1UG19CS19\nSumukh Raju Bhat\
nH Sec");
        int choice;
        int max_ = 100;
        ShortAnswer sarr[] = new ShortAnswer[max_];
        LongAnswer larr[] = new LongAnswer[max_];
        MCQ marr[] = new MCQ[max_];
        int sn = 0;
        int ln = 0;
        int mn = 0;
        boolean done = false;
        while (!done) {
            System.out.println("1. To Enter Short Answer\n2. To Enter
Long Answer\n3. To Enter MCQ\nAny other key. Quit");
            System.out.println("Enter the choice: ");
            Scanner sc = new Scanner(System.in);
            choice = sc.nextInt();
            switch(choice)
            {
                case 1:
                    ShortAnswer sAnswer = new ShortAnswer();
                    sAnswer.readQuestion();
                    sarr[sn++] = sAnswer;
                    break;
                case 2:
```

```
                LongAnswer lAnswer = new LongAnswer();
                lAnswer.readQuestion();
                larr[ln++] = lAnswer;
                break;
            case 3:
                MCQ m = new MCQ();
                m.readQuestion();
                marr[mn++] = m;
                break;
            default:
                done = true;
        }
        System.out.println();
    }
    System.out.println("The Short Answers are: ");
    for (int i = 0; i < sn; ++i) {
        System.out.println(sarr[i].toString());
    }
    System.out.println();
    System.out.println("The Long Answers are: ");
    for (int i = 0; i < ln; ++i) {
        System.out.println(larr[i].toString());
    }
    System.out.println();
    System.out.println("The MCQs are: ");
    for (int i = 0; i < mn; ++i) {
        System.out.println(marr[i].toString());
    }
    System.out.println();

}
```

```
}
```

Output Screen shots

```
sumukhbhat2701@SRBs-PC$ javac TQManager.java
sumukhbhat2701@SRBs-PC$ java TQManager
SRN: PES1UG19CS19
Sumukh Raju Bhat
H Sec
1. To Enter Short Answer
2. To Enter Long Answer
3. To Enter MCQ
Any other key. Quit
Enter the choice:
1
Enter the question
What is ZBZ?

1. To Enter Short Answer
2. To Enter Long Answer
3. To Enter MCQ
Any other key. Quit
Enter the choice:
1
Enter the question
What is HYS?

1. To Enter Short Answer
2. To Enter Long Answer
3. To Enter MCQ
Any other key. Quit
Enter the choice:
1
Enter the question
How is HYE done?

1. To Enter Short Answer
2. To Enter Long Answer
3. To Enter MCQ
Any other key. Quit
Enter the choice:
2
Enter the number of lines:
10
Enter the Question:
What is KHF?

1. To Enter Short Answer
2. To Enter Long Answer
3. To Enter MCQ
Any other key. Quit
Enter the choice:
2
Enter the number of lines:
100
Enter the Question:
What is GHE?
```

```
1. To Enter Short Answer
2. To Enter Long Answer
3. To Enter MCQ
Any other key. Quit
Enter the choice:
3
Enter the number of choices:
4
Enter the question
What is HYS?
Enter choice# 1
7
Enter choice# 2
8
Enter choice# 3
9
Enter choice# 4
4

1. To Enter Short Answer
2. To Enter Long Answer
3. To Enter MCQ
Any other key. Quit
Enter the choice:
3
Enter the number of choices:
2
Enter the question
What is PQL?
Enter choice# 1
F
Enter choice# 2
H

1. To Enter Short Answer
2. To Enter Long Answer
3. To Enter MCQ
Any other key. Quit
Enter the choice:
99

The Short Answers are:
Question: What is ZBZ?
Number of Lines: 1
Question: What is HYS?
Number of Lines: 1
Question: How is HYE done?
Number of Lines: 1

The Long Answers are:
Question: What is KHF?
Number of Lines: 10
Question: What is GHE?
```

```
The MCQs are:
Number of Choices: 4
Question: What is HYS?
7
8
9
4

Number of Choices: 2
Question: What is PQL?
F
H
```