Name:	SRN:PES1UG19CS427	
Sammith S Bharadwaj	Date:09/02/2022	Week Number:02

Write a Java program to implement the following.

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.

copy paste the complete code here (definition of all 3 classes and TQManager class)

```java
import java.util.Scanner;

abstract class TestQuestion {
  String question;

  abstract void readQuestion(Scanner sc);
}

class ShortAnswer extends TestQuestion {
  int numLines = 1;

  void readQuestion(Scanner sc) {
    sc.nextLine();
    question = sc.nextLine();
  }
```

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```java
  public String toString() {
    return "Sammith S Bharadwaj PES1UG19CS427\n" + "Short Answer
Question – " + question + "\nnumLines –" + numLines;
  }
}


class LongAnswer extends TestQuestion {
  int numLines;

  void readQuestion(Scanner sc) {
    sc.nextLine();
    question = sc.nextLine();
    System.out.print("Sammith S Bharadwaj PES1UG19CS427 Enter
number of Lines: ");
    numLines = sc.nextInt();
  }

  public String toString() {
    return "Sammith S Bharadwaj PES1UG19CS427\n" + "Long Answer
Question – " + question + "\nnumLines –" + numLines;
  }
}


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

  void readQuestion(Scanner sc) {
    sc.nextLine();
    question = sc.nextLine();
    System.out.print("Sammith S Bharadwaj PES1UG19CS427 Enter
number of choices: ");
    numChoices = sc.nextInt();
    choices = new String[numChoices];
    System.out.println("Sammith S Bharadwaj PES1UG19CS427 Enter
your choices");
    sc.nextLine();
    for (int i = 0; i < numChoices; i++) {
      System.out.print((i + 1) + ": ");
      choices[i] = sc.nextLine();
    }
  }
```

```java
  public String toString() {
    String str = "Sammith S Bharadwaj PES1UG19CS427\n" + "MCQ
Question – " + question + "\nnumChoices –" + numChoices;
    for (int i = 0; i < numChoices; i++) {
      str = str + "\n" + (i + 1) + ": " + choices[i];
    }
    return str;
  }
}

class TQManager {
  public static void main(String args[]) {
    TestQuestion tq[];
    int choice;
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter number of questions: ");
    int no_of_questions = sc.nextInt();
    tq = new TestQuestion[no_of_questions];
    for (int i = 0; i < no_of_questions; i++) {
      System.out
          .print("\nEnter 1 for Short Answer\nEnter 2 for Long
Answer\nEnter 3 for MCQ Answer\n Enter your choice: ");
      choice = sc.nextInt();
      switch (choice) {
        case 1: {
          tq[i] = new ShortAnswer();
          break;
        }
        case 2: {
          tq[i] = new LongAnswer();
          break;
        }
        case 3: {
          tq[i] = new MCQ();
          break;
        }
      }
      System.out.print("Enter your question: ");
      tq[i].readQuestion(sc);
    }
```

```java
    System.out.println("\n***************Question
Paper****************\n\n");
    for (int i = 0; i < no_of_questions; i++) {
      System.out.println(tq[i].toString());
    }
  }
}
```

Output Screen shots (all 3 type of Questions)

```
Sammiths-MacBook-Pro:~ sammithsbharadwaj$   /usr/bin/env /Library/Java/JavaVirtualMachines/adoptopenjdk-16.jdk/Contents/Home/bin/java -XX:+ShowCodeDetailsInExc
eptionMessages -cp /private/var/folders/r4/hwr2k7h54y10cljgzdmgbgd00000gn/T/vscodesws_95177/jdt_ws/jdt.ls-java-project/bin TQManager
Enter number of questions: 3

Enter 1 for Short Answer
Enter 2 for Long Answer
Enter 3 for MCQ Answer
 Enter your choice: 1
Enter your question: Who is the greatest cricketer ever?

Enter 1 for Short Answer
Enter 2 for Long Answer
Enter 3 for MCQ Answer
 Enter your choice: 2
Enter your question: Why is India the greatest team?
Sammith S Bharadwaj PES1UG19CS427 Enter number of Lines: 420

Enter 1 for Short Answer
Enter 2 for Long Answer
Enter 3 for MCQ Answer
 Enter your choice: 3
Enter your question: For which team does Kane Smileson play for?
Sammith S Bharadwaj PES1UG19CS427 Enter number of choices: 4
Sammith S Bharadwaj PES1UG19CS427 Enter your choices
1: Nonsense Land
2: Useless Land
3: New Zealand
4: Scam land

***************Question Paper****************

Sammith S Bharadwaj PES1UG19CS427
Short Answer Question - Who is the greatest cricketer ever?
numLines -1
Sammith S Bharadwaj PES1UG19CS427
Long Answer Question - Why is India the greatest team?
numLines -420
Sammith S Bharadwaj PES1UG19CS427
MCQ Question - For which team does Kane Smileson play for?
numChoices -4
1: Nonsense Land
2: Useless Land
3: New Zealand
4: Scam land
Sammiths-MacBook-Pro:~ sammithsbharadwaj$
```

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