Question 1

CP - Write a program to demonstrate ***NumberFormatException***

Hint =>

1. Define a variable to take user input as a String
2. Use Integer.parseInt() to generate this exception. ***Integer.parseInt()*** is a built-in function in java.lang.Integer class to extract the number from text. In case the text does not contain numbers, the method will throw ***NumberFormatException,*** which is a runtime exception
3. Write a Method to generate the Exception. Use ***Integer.parseInt(text)*** to extract a number from the text. This will generate a runtime exception and abruptly stop the program.
4. Write the Method to demonstrate ***NumberFormatException***. Use ***Integer.parseInt(text)*** to extract a number from the text. This will generate a runtime exception. Use the ***try-catch*** block to handle the ***NumberFormatException*** as well as the generic runtime exception
5. From the main Firstly call the method to generate the Exception then call the method to handle the ***RuntimeException***

Question 2

CP - Write a program to create a substring from a String using the ***charAt()*** method. Also, use the String built-in method ***substring()*** to find the substring of the text. Finally, compare the two strings and display the results

Hint =>

1. Take user input using the ***Scanner next()*** method to take the String variable and also the start and the end index to get the substring from the given text
2. Write a method to create a substring from a string using the ***charAt()*** method with the string, start, and end index as the parameters
3. Write a method to compare two strings using the charAt() method and return a boolean result
4. Use the String built-in method substring() to get the substring and compare the two strings. Finally, display the result

Question 3

CP - Write a program to compare two strings using the ***charAt()*** method and check the result with the built-in ***String equals()*** method

Hint =>

1. Take user input using the ***Scanner next()*** method for 2 String variables
2. Write a method to compare two strings using the ***charAt()*** method and return a boolean result
3. Use the String Built-In method to check if the results are the same and display the result

Question 4

CP - Write a program to demonstrate ***IllegalArgumentException***

Hint =>

1. Define a variable of type String and take user input to assign a value
2. Write a Method to generate the Exception. Here, use the ***subString()*** and set the start index to be greater than the end index. This will generate a runtime exception and abruptly stop the program.
3. Write the Method to demonstrate ***IllegalArgumentException***. Here, use the ***subString()*** and set the start index to be greater than the end index. This will generate a runtime exception. Use the ***try-catch*** block to handle the ***IllegalArgumentException*** and the generic runtime exception
4. From the main Firstly call the method to generate the Exception then call the method to handle the ***RuntimeException***

Question 5

CP - Write a program to demonstrate ***NullPointerException***.

Hint =>

1. Write a Method to generate the Exception. Here, define the variable text and initialize it to null. Then call one of the String Method to generate the exception

2. Write the Method to demonstrate ***NullPointerException***. Here, define the variable text and initialize it to null. Then, write a ***try-catch*** block for handling the Exception while accessing one of the ***String*** method
3. From the main Firstly call the method to generate the Exception then refactor the code to call the method to handle the ***RuntimeException***

Question 6

CP - Write a program to convert the complete text to lowercase and compare the results

Hint =>

1. Take user input using the ***Scanner nextLine()*** method to take the complete text into a String variable
2. Write a method using the String built-in ***charAt()*** method to convert each character to lowercase if it is uppercase. Use the logic ASCII value of 'a' is 97 and 'A' is 65 so the difference is 32, similarly ASCII value of 'b' is 98 and 'B' is 66 so the difference is 32, and so on
3. Write a method to compare two strings using the charAt() method and return a boolean result
4. In the ***main()***, use the String built-in method ***toLowerCase()*** to get the lowercase text and compare the two strings using the user-defined method. And finally, display the result

Question 7

CP - Write a program to return all the characters in a string using the user-defined method, compare the result with the String built-in ***toCharArray()*** method, and display the result

Hint =>

1. Take user input using the ***Scanner next()*** method to take the text into a String variable
2. Write a method to return the characters in a string without using the ***toCharArray()***
3. Write a method to compare two string arrays and return a boolean result
4. In the main method, call the user-defined methods and the String builtin ***toCharArray()*** method, compare the 2 arrays, and finally display the result

Question 8

CP - Write a program to demonstrate ***StringIndexOutOfBoundsException***

Hint =>

1. Define a variable of type String and take user input to assign a value
2. Write a Method to generate the Exception. Access the index using ***charAt()*** beyond the length of the String. This will generate a runtime exception and abruptly stop the program.
3. Write the Method to demonstrate ***StringIndexOutOfBoundsException***. Access the index using ***charAt()*** beyond the length of the String. Then, write try catch block for Exception while accessing the String method
4. From the main Firstly call the method to generate the Exception then call the method to handle the ***RuntimeException***

Question 9

CP - Write a program to convert the complete text to uppercase and compare the results

Hint =>

1. Take user input using the ***Scanner nextLine()*** method to take the complete text into a String variable
2. Write a method using the String built-in ***charAt()*** method to convert each character if it is lowercase to the uppercase. Use the logic ASCII value of 'a' is 97 and 'A' is 65 so the difference is 32, similarly ASCII value of 'b' is 98 and 'B' is 66 so the difference is 32, and so on
3. Write a method to compare two strings using the charAt() method and return a boolean result
4. In the ***main()***, use the String built-in method ***toUpperCase()*** to get the uppercase text and compare the two strings using the user-defined method. Finally, display the result

Question 10

CP - Write a program to demonstrate ***ArrayIndexOutOfBoundsException***

Hint =>

1. Define a variable of an array of names and take input from the user
2. Write a Method to generate the Exception. Here, the access index is larger than the length of the array. This will generate a runtime exception and abruptly stop the program.
3. Write the Method to demonstrate ***ArrayIndexOutOfBoundsException***. Here, the access index is larger than the length of the array. This will generate a runtime exception. Use the try-catch block to handle the ***ArrayIndexOutOfBoundsException*** and the generic runtime exception
4. From the main Firstly call the method to generate the Exception then call the method to handle the ***RuntimeException***

Question 11

CP - Write a program to trim the leading and trailing spaces from a string using the ***charAt()*** method

Hint =>

1. Create a method to trim the leading and trailing spaces from a string using the ***charAt()*** method. Inside the method, run a couple of loops to trim leading and trailing spaces and determine the starting and ending points with no spaces. Return the start point and end point in an array
2. Write a method to create a substring from a string using the ***charAt()*** method with the string, start, and end index as the parameters
3. Write a method to compare two strings using the ***charAt()*** method and return a boolean result
4. The main function calls the user-defined trim and substring methods to get the text after trimming the leading and trailing spaces. Post that use the String built-in method ***trim()*** to trim spaces and compare the two strings. Finally display, the result

Question 12

CP - Write a program to find and return the length of a string without using the ***length()*** method

Hint =>

1. Take user input using the ***Scanner next()*** method
2. Create a method to find and return a string's length without using the built-in ***length()*** method. The logic for this is to use the infinite loop to count each character till the ***charAt()*** method throws a runtime exception, handles the exception, and then return the count
3. The main function calls the user-defined method as well as the built-in ***length()*** method and displays the result

Question 13

CP - Rock-Paper-Scissors is a game played between a minimum of two players. Each player can choose either rock, paper, or scissors. Here, the game is played between a user and a computer. Based on the rules, either a player or a computer will win. Show the stats of player and computer win in a tabular format across multiple games. Also, shows the winning percentage between the player and the computer.

Hint =>

1. **The rule is:** rock-scissors: rock will win (rock crushes scissors); rock-paper: paper wins (paper covers rock); scissors-paper: scissors win (scissors cut paper)
2. Create a Method to find the Computer Choice using the ***Math.random()***
3. Create a Method to find the winner between the user and the computer
4. Create a Method to find the average and percentage of wins for the user and the computer and return a String 2D array
5. Create a Method to display the results of every game and also display the average and percentage wins
6. In the main take, user input for the number of games and call methods to display results

Question 14

CP - Write a program to split the text into words and find the shortest and longest strings in a given text

Hint =>

1. Take user input using the ***Scanner nextLine()*** method
2. Create a Method to split the text into words using the charAt() method without using the String built-in ***split()*** method and return the words.
3. Create a method to find and return a string's length without using the ***length()*** method.

4. Create a method to take the word array and return a 2D String array of the word and its corresponding length. Use the String built-in function ***String.valueOf()*** to generate the String value for the number
5. Create a Method that takes the 2D array of words and the corresponding length as parameters, find the shortest and longest string, and return them in a 1D int array.
6. The main function calls the user-defined methods and displays the result.

Question 15

CP - Write a program to find vowels and consonants in a string and display the count of Vowels and Consonants in the string

Hint =>

1. Create a method to check if the character is a vowel or consonant and return the result. The logic used here is as follows:
   a. Convert the character to lowercase if it is an uppercase letter using the ASCII values of the characters
   b. Check if the character is a vowel or consonant and return Vowel, Consonant, or Not a Letter
2. Create a method to find vowels and consonants in a string using the ***charAt()*** method and finally return the count of vowels and consonants in an array
3. Finally, the main function takes user inputs, calls the user-defined methods, and displays the result.

Question 16

CP - Write a program to take user input for the age of all 10 students in a class and check whether the student can vote depending on his/her age is greater or equal to 18.

Hint =>

1. Create a method to define the random 2-digit age of several students provided as method parameters and return a 1D array of ages of n students
2. Create a method that takes an array of ages as a parameter and returns a 2D String array of age and a boolean true or false to indicate can and cannot vote. Inside the method firstly validate the age for a negative number, if a negative cannot vote. The valid age check for age is 18 or above to set true to indicate can vote.
3. Create a method to display the 2D array in a tabular format.
4. Finally, the main function takes user inputs, calls the user-defined methods, and displays the result.

Question 17

CP - Write a program to find vowels and consonants in a string and display the character type - Vowel, Consonant, or Not a Letter

Hint =>

1. Create a method to check if the character is a vowel or consonant and return the result. The logic used here is as follows:
   a. Convert the character to lowercase if it is an uppercase letter using the ASCII values of the characters
   b. Check if the character is a vowel or consonant and return Vowel, Consonant, or Not a Letter
2. Create a Method to find vowels and consonants in a string using the ***charAt()*** method and return the character and vowel or consonant in a 2D array
3. Create a Method to Display the 2D Array of Strings in a Tabular Format
4. Finally, the main function takes user inputs, calls the user-defined methods, and displays the result.

Question 18

CP - Write a program to split the text into words, compare the result with the ***split()*** method, and display the result

Hint =>

1. Take user input using the ***Scanner nextLine()*** method
2. Create a Method to find the length of the String without using the built-in ***length()*** method.
3. Create a Method to split the text into words using the charAt() method without using the String built-in ***split()*** method and return the words. Use the following logic
   a. Firstly, count the number of words in the text and create an array to store the indexes of the spaces for each word in a 1D array
   b. Then, create an array to store the words and use the indexes to extract the words
4. Create a method to compare the two String arrays and return a boolean
5. The main function calls the user-defined method and the built-in ***split()*** method. Call the user-defined method to compare the two string arrays and display the result

Question 19

CP - Create a program to take input marks of students in 3 subjects: physics, chemistry, and maths. Compute the percentage and then calculate the grade as shown in the figure below

Grade	Remarks	Mark
A	(Level 4, above agency-normalized standards)	80% and al
B	(Level 3, at agency-normalized standards)	70-79%
C	(Level 2, below, but approaching agency-normalized standards)	60-69%
D	(Level 1, well below agency-normalized standards)	50-59%
E	(Level 1- , too below agency-normalized standards)	40-49%
R	(Remedial standards)	39% and b

Hint =>

1. Write a method to generate random 2-digit scores for Physics, Chemistry, and Math (PCM) for the students and return the scores. This method returns a 2D array with PCM scores for all students
2. Write a Method to calculate the total, average, and percentages for each student and return a 2D array with the corresponding values. Please ensure to round off the values to 2 Digits using ***Math.round()*** method
3. Write a Method to calculate the grade based on the percentage as shown in the ref table and return a 2D array of students' grades
4. Finally, write a Method to display the scorecard of all students with their scores, total, average, percentage, and grade in a tabular format.

Question 20

CP - Write a program to split the text into words and return the words along with their lengths in a 2D array

Hint =>

1. Take user input using the ***Scanner nextLine()*** method
2. Create a Method to split the text into words using the ***charAt()*** method without using the String built-in ***split()*** method and return the words.
3. Create a method to find and return a string's length without using the ***length()*** method.
4. Create a method to take the word array and return a 2D String array of the word and its corresponding length. Use the String built-in function ***String.valueOf()*** to generate the String value for the number
5. The main function calls the user-defined method and displays the result in a tabular format. During the display, make sure to convert the length value from String to Integer and then display