

*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**(KIBU)**

**UNIVERSITY EXAMINATIONS  
2019/2020 ACADEMIC YEAR**

**YEAR THREE EXAMINATIONS  
SPECIAL/SUPPLEMENTARY EXAMINATIONS**

**FOR THE DEGREE OF  
BACHELOR OF SCIENCE  
(COMPUTER SCIENCE)**

**COURSE CODE : CSC 364E**

**COURSE TITLE : ADVANCED JAVA  
PROGRAMMING**

**DATE: 18/02/2021 TIME: 08.00 A.M – 10.00 A.M**

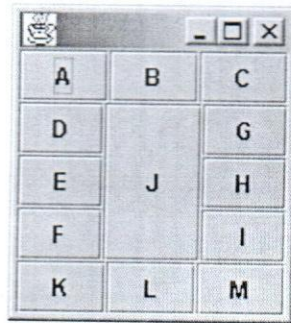
**INSTRUCTIONS TO CANDIDATES**

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**ANSWER QUESTIONS ONE AND ANY OTHER TWO**

### QUESTION ONE (COMPULSORY) (30 MARKS)

- a. Write the code to generate the GUI below by first designing the layout: [7 marks]



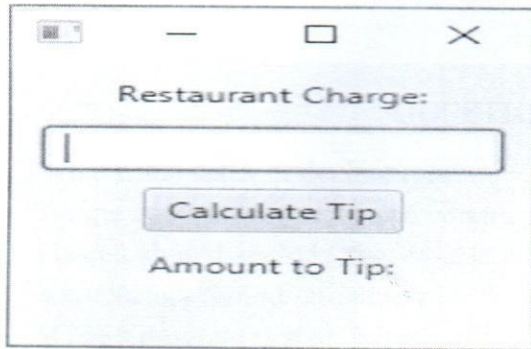
- b. Java makes use of streams when working with file I/O. What is a stream? [2 marks]
- c. The class Mystery implements the interface ActionListener. What are the obligations of the class Mystery? [2 marks]
- d. Create four check boxes with text "Tokyo", "London", "Kigali" and "Nairobi". [4 marks]
- e. Group these four check boxes on a panel with title "Friendly Cities". [3 marks]
- f. Name and describe any two layout managers for a JFrame explaining with code segments how elements are added. [4 marks]
- g. Explain how you define a listener class and stating clearly the obligations [2 marks]
- h. Show how you define a customized exception SecurityCheckException that displays the message "Security violation!!!" when thrown. [6 marks]

### QUESTION TWO (20 MARKS)

- a) Distinguish between an abstract class and an interface. [2 marks]
- b) Assume a class Student implements a Speaker interface. This interface includes two abstract methods, speak() and announce(String str). A Student contains one instance data, String yearOfStudy. Write the Student class so that it implements Speaker as follows. The speak method will output "I am a newbie here" if the Student is a "Year 1", "I hate school" if the Student is either a "Year 2" or a "Year 3", or "I can not wait to graduate" if the student is a "Year 4". The announce method will output "I am a Student, here is what I have to say" followed by the String parameter on a separate line. Finally, the yearOfStudy is initialized in the constructor. Only implement the constructor and the methods to implement the Speaker interface. [12 marks]
- c) Write a short driver program that instantiates the Student class and demonstrates that the methods you implemented from the interface behave correctly by using a set of appropriate arguments. [6 marks]

### QUESTION THREE (20 MARKS)

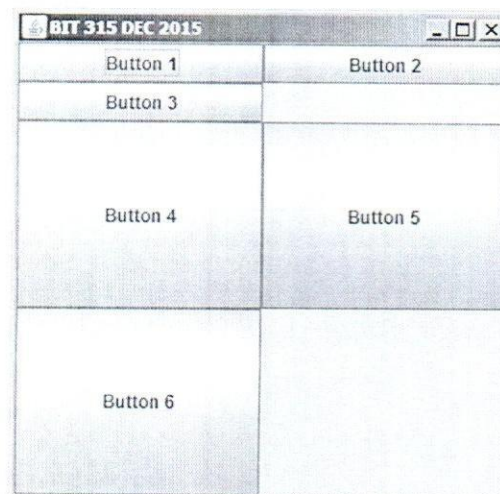
You are required to create a tip calculator application with a **JavaFX** user interface. The application will let you enter the amount of a restaurant charge, and it will display the amount of a 20% tip. The completed user interface will look like this:



- a) Write the code to produce an empty window. Your code should include appropriate include statements. [6 marks]
- b) Create a Scene containing the following controls: [6 marks]
  - i. Various Label controls to display text
  - ii. A `TextField` control to read the user's input
  - iii. A Button control to calculate and display the tip
- c) Use a suitable layout container to achieve a vertical arrangement. [2 marks]
- d) Write an event handler that responds when the user clicks the Button control. The event handler should calculate 20 percent of the number that the user entered into the `TextField` control, and then display that value in the bottom Label control. [6 marks]

### QUESTION FOUR (20 MARKS)

- a. Provide code to generate the following JFrame. [8 marks]



- b. You are designing a GUI that uses menus and your GUI has a menu with the title "Drawing Template" which in turn has menu items named "Circle", "Square", and "Rectangle". Write Java statements to create the menu with its items as described and add it to the menu bar. [6 marks]
- c. Using the appropriate Graphics objects write the code to draw a circle on a GUI when the menu item is selected. [6 marks]

#### QUESTION FIVE (20 MARKS)

- a. What is the catch or declare rule? [2 marks]
- b. Define two custom exception classes TimeInUseException and InvalidTimeException. Your classes should include the default constructor and parameterized constructor. The default constructors should initialize with the name of the exception. [8 marks]
- c. Write a program that allows students to schedule appointments at either 1, 2, 3, 4, 5, or 6 o'clock p. m. Use an array of six strings to store the names for the time slots. Write a loop that iterates as long as the array has a free space. Within a try block, allow the user to enter a time and a name. If the time is free, put the name in the array. If the time is not free, throw a TimeInUseException. If the time is not valid, throw an InvalidTimeException. Use a catch block for each different kind of exception. [10 marks]