



*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**(KIBU)**

**UNIVERSITY EXAMINATIONS  
2021 / 2022 ACADEMIC YEAR**

**SPECIAL / SUPPLEMENTARY EXAMINATIONS  
YEAR THREE EXAMINATIONS**

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

**COURSE CODE : CSC 364E**

**COURSE TITLE : ADVANCED JAVA  
PROGRAMMING**

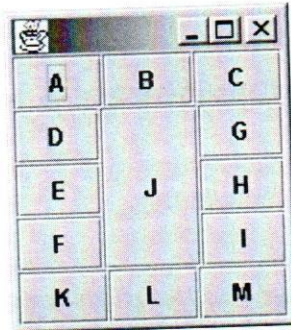
**DATE: 19/01/2022**

**TIME: 11.00 A.M – 1.00 P.M**

**INSTRUCTIONS TO CANDIDATES  
ANSWER QUESTIONS ONE AND ANY OTHER TWO**

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

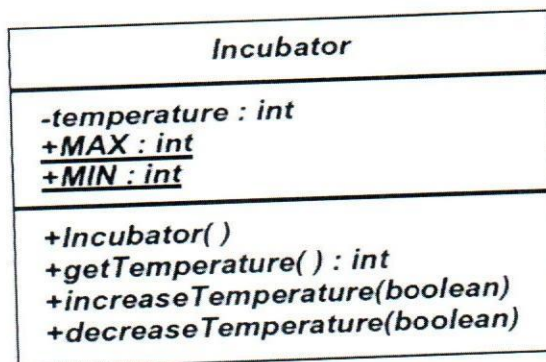
- a. Write the code to generate the GUI below by first designing the layout: [7 marks]



- 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]

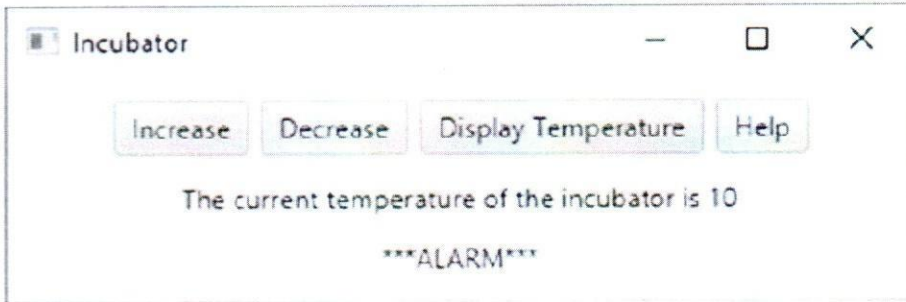
Consider a class that keeps track of the temperature within an incubator. The UML diagram is shown below:



When an `Incubator` object is created, the temperature is initially set to 5°. The `increaseTemp` method increases the temperature by 1, and the `decreaseTemp` method decreases the temperature by 1. However, the temperature must never be allowed to rise above a maximum value of 10 nor fall below a minimum value of -10. If an attempt is made to increase or decrease the temperature so it falls outside this range, then an alarm must be raised; the methods in this case should not increase or decrease the temperature at all but should return a value of `false`, indicating that the alarm should be raised. If the temperature is changed successfully, however, a value of `true` is returned.

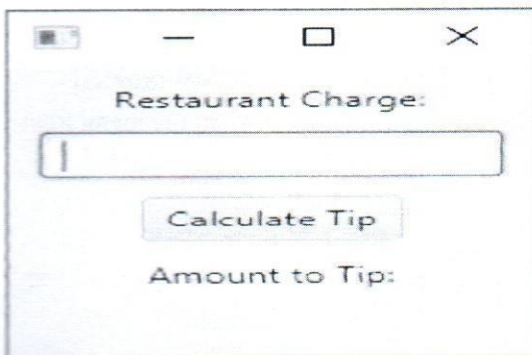


- a) Write the code for the Incubator class. [10 marks]
- b) Create a graphical user interface shown below using JavaFX or Java swing for the Incubator class. [10 marks]



### 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:

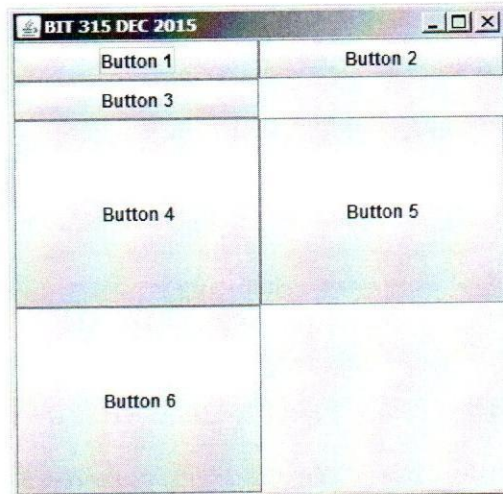


- a) Write the code to produce an empty window. Your code should include appropriate include statements. [6 marks]
- b) Create a Scene containing the following controls: [6 marks]
- Various Label controls to display text
  - A `TextField` control to read the user's input
  - A `Button` control to calculate 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]