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FINAL EXAMINATION

MARCH 2024

COURSE TITLE	**MOBILE APPLICATION DEVELOPMENT**
COURSE CODE	**RCIT4733**
DATE/DAY	**21 JUNE 2024 / FRIDAY**
TIME/DURATION	**09:00 AM - 11:00 AM / 02 Hour(s) 00 Minute(s)**

INSTRUCTIONS TO CANDIDATES :

1. Please read the instruction under each section carefully.
2. Candidates are reminded not to bring into examination hall/room any form of written materials or electronic gadget except for stationery that is permitted by the Invigilator.
3. Students who are caught breaching the Examination Rules and Regulation will be charged with an academic dishonesty and if found guilty of the offence, the maximum penalty is expulsion from the University.

(This Question Paper consists of **9** Printed Pages including front page)

*****DO NOT OPEN THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO*****

This question paper contains TWO (2) sections in this examination paper. Please answer ALL questions in the answer booklet. [50 MARKS]

SECTION A (20 Marks)

There are TWENTY (20) questions on this part of the examination paper. Answer ALL questions in the answer booklet.

1. Given the following four patterns:

Pattern A
```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
1 2 3 4 5 6
```

Pattern B
```
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

Pattern C
```
          1
        2 1
      3 2 1
    4 3 2 1
  5 4 3 2 1
6 5 4 3 2 1
```

Pattern D
```
1 2 3 4 5 6
  1 2 3 4 5
    1 2 3 4
      1 2 3
        1 2
          1
```

Which of the above patterns is produced by the following code?

```
fun main() {
   for (i in 1..6){
        for (j in 6 downTo 1){
            if (j<=i){
                print(j)
            }
            else {
                print(" ")
            }
        }
        println()
    }
}
```

A. Pattern A
B. Pattern B
C. Pattern C
D. Pattern D

2. Which of the following is **NOT** a valid variable name in Kotlin?

A. `my_variable`
B. `3variable`
C. `_variable`
D. `variable_3`

3. Which of the following data types is **NOT MUTABLE** in Kotlin?

   A. `val`
   B. `set`
   C. `map`
   D. `list`

4. What is the output of the following code snippet?

```
fun <K, V> Map<K, V>.slice(indices: IntRange): Map<K, V> {
    val entriesList = this.entries.toList()
    return entriesList.slice(indices).associate { it.toPair() }
}
fun main() {
  val readOnlyJuiceMenu = mapOf("apple" to 100, "kiwi" to 190,"orange" to 100)
  print(readOnlyJuiceMenu)
  val slicedMap = readOnlyJuiceMenu.slice(1..2)
  print(slicedMap)
}
```

   A. `{apple=100, kiwi=190}`
   B. `{kiwi=190, orange=100}`
   C. `{apple=100, orange=100}`
   D. `{orange=100, kiwi=190}`

5. What is the Kotlin code to shuffle `list1`?

   A. `mutablelist1.shuffled()`
   B. `shuffled(list1)`
   C. `random.shuffled(mutablelist1)`
   D. `random.shuffleMutableList(mutablelist1)`

6. What does the '`range()`' function in Kotlin return?

   A. A list of numbers
   B. A tuple of numbers
   C. An iterator of numbers
   D. A dictionary of numbers

7. Select **THREE (3)** parts that are absolutely needed to create and call a function.

I. Function header (including the definition and the name)
II. Function body
III. Variables
IV. Return statement
V. Function call

A. I, II and III only
B. I, III and IV only
C. I, III and V only
D. I, II and V only

8. In Kotlin, which of the following is used to terminate the current loop iteration and move to the next iteration?

A. `break`
B. `stop`
C. `skip`
D. `continue`

9. What would be the first line of output for Kotlin code below?

```
class InitOrderDemo(name:String){
    val firstProperty = "First property: $name".also(::println)
    init {
        println("First initialize block that prints $name")
    }
}

fun main(){
    InitOrderDemo("hello")
}
```

A. First property: $name
B. First property: hello
C. First initialize block that prints #name
D. First initialize block that prints hello

10. Which of the following is **NOT** a principle of Object-Oriented Programming?

A. Inheritance
B. Encapsulation
C. Polymorphism
D. Recursion

11. What is the difference between a property and a field in Kotlin?

A. A property is a method, while a field is a variable
B. A property is a variable, while a field is a constant
C. A property is a constant, while a field is a variable
D. A property has a getter and setter, while a field does not

12. How do you define a property in Kotlin that can only be accessed within the same class? Using the keyword _____.

A. internal
B. protected
C. private
D. local

13. What is the keyword used to define a constructor in Kotlin?

A. constructor
B. new
C. create
D. init

14. You can create an emulator to simulate the configuration of a particular type of Andriod device using a tool like _____.

A. AVD Manager
B. Virtual Editor
C. Theme Editor
D. Android SDK Manager

15. Which of the following is **NOT** True about fragments?

A. A fragment is defined in a Kotlin class
B. A fragment's User Interface (UI) is defined in an XML layout file.
C. A fragment has its own lifecycle and receives its own input events.
D. It is not possible to remove a fragment while the activity is running.

16. Which of the following is contained in the src folder?

A. XML
B. Maniferst
C. Java Source Code
D. None of the above

17. Which of the following is the topmost layer of android architecture?

A. Applications
B. Linux Kernel
C. Applications Framework
D. System Libraries and Android Runtime

18. Which of the following is the built-in database of Android?

A. SQLite
B. MySQL
C. Oracle
D. None of the above

19. Which of the following is the API level of Android version 5.0?

A. 21
B. 20
C. 11
D. 41

20. Which of the following Andoid library provides access to the database?

A. android.content
B. android.database
C. android.api
D. None of the above

SECTION B **(30 Marks)**

There are TWO (2) questions in this part of the examination paper. Answer ALL questions in the answer booklet.

1. Functions in Kotlin programming language can make programs to be modular and reusable as it is one of the central goals in software engineering.

   a) Define **FIVE (5)** functions definition headers called as `enterOption`, `enterData`, `kilogramToGram`, `gramToKilogram` and `displayConversionResult`. The `enterOption` function has no parameter while `enterData`, `kilogramToGram`, `gramToKilogram`, and `displayConversionResult` functions contains parameter(s). (5 marks)

   b) Write the body for each function based on the description below:

      i. The `enterOption` function is a value returning function that gets and validates the option to either convert from kilogram to gram or vice-versa. The option input will be repeated until a correct option is entered by the user. (3 marks)

      ii. The `enterData` function is a value returning function that gets the data from the user based on the option entered. (2 marks)

      iii. The `kilogramToGram` function is a value returning function that calculates the conversion from kilogram to gram based on the formula. (1 marks)

      iv. The `gramToKilogram` function is a value returning function that calculates the conversion from gram to kilogram based on the formula. (1 marks)

      v. The `displayConversionResult` function is a void function that displays the conversion result based on the option entered in `enterOption` function. (1 marks)

   c) Write the main function that contains the functions caller. (2 marks)

2. Most mobile applications contain more than one screen. Each distinct screen is built as a separate fragment. A fragment is like a kind of sub activity that's displayed inside an activity's layout. The standard way of navigating between fragments is to use Android's Navigation component. The Navigation component is part of Android Jetpack and it's a suite of libraries, plug-ins and tools that being added to project. It's extremely flexible and simplifies many of the complexities of fragment navigation.

   a) List down **THREE (3)** main parts of navigating between fragments. (3 marks)

   b) Describe **EACH** part mentioned in **Q2(a)**. (6 marks)

   c) Write an XML code for a Kotlin app's navigation graph based on all the following details.

   Root Element

   ```
   Navigation xmlns: "http://schemas.android.com/apk/res/android"
   Xmlns app: "http://schemas.android.com/apk/res-auto"
   Xmlns tools: "http://schemas.android.com/tools"
   Android ID: "@+id/nav_graph"
   Start Destination = "@id/welcomeFragment"
   ```

   Fragment 1

   ```
   Android ID: "welcomeFragment"
   Android Name: "com.FinalExam.WelcomeFragment"
   Android Label: "fragment_welcome"
   Tools Layout = "@layout/fragment_welcome"
   Android ID: "@+id/action_welcomeFragment_to_messageFragment"
   App Destination: "@id/messageFragment"
   ```

Fragment 2

```
Android ID: " @+id/messageFragment"

Android Name: "com.FinalExam.MessageFragment"

Android Label: "fragment_message"

Tools Layout = "@layout/fragment_message"
```

(6 marks)

***** END OF QUESTION PAPER *****