Scott Christian UNIVERSITY

SCHOOL OF PROFESSIONAL STUDIES

BACHELOR OF INFORMATION COMMUNICATION TECHNOLOGY

UNIT CODE/NAME: BCT 313: ADVANCED OBJECT ORIENTED PROGRAMMING

September- December 2019/2020 End Semester Exam - Time: 2 Hours

Instructions: Answer Question ONE (Compulsory) and any other TWO questions.

QUESTION ONE

a) Define the following terms as used Java programming **(6 Marks)**
   i) Instance variable
   ii) Interface
   iii) Exception

b) Differentiate between checked and unchecked exceptions **(4 Marks)**

c) With aid of java code fragments explain how a superclass constructor can be invoked in a subclass **(4 Marks)**

d) Explain the scope of the following access modifiers **(4 Marks)**
   i) Protected
   ii) Private

e) Using java code fragments show how a method can return an object **(6 Marks)**

f) With aid of an example demonstrate how an inner class can be instantiated **(5 Marks)**

g) State the reason why interfaces do not have constructors **(1 Mark)**

QUESTION TWO

a) Explain the importance of exception handling in java **(1 Marks)**

b) With aid of Java code fragments differentiate between method overloading and method overloading **(4 Marks)**

c) Explain the similarities and differences between abstract classes and interfaces **(5 Marks)**

d) With aid of java code fragments show the uses of the keyword **this** **(5 Marks)**

QUESTION THREE

a) Explain the three basic flow control structures in Java **(4 Marks)**

b) Differentiate between UDP and TCP **(3 Marks)**

c) Describe the client server Model **(3 Marks)**

d) Explain the functions of the following networking classes **(3 Marks)**
   i. Socket
   ii. ServerSocketClass

e) Differentiate between a socket and a port **(2 Marks)**

QUESTION FOUR

a) Explain java thread life cycle **(4 Marks)**

b) Consider the following class definition

```
Class Example implements Runnable {
    public static Object o = new Object();
    int count = 0;
    public void run() {
    while (true) { synchronized (o) {
count ++; }
 }
}}
```

i. Explain the function of the method synchronized in the code **(1 Marks)**

ii. Show how to start two threads, each executing this run method **(4 Marks)**

c) State two uses of nested classes in Java **(2 Marks)**

d) Using java code fragments show how a method can take an object as a parameter **(4 Marks)**

QUESTION FIVE

a) Change the **divide** method so that it throws **IllegalArgumentException** with an appropriate message if **b** is zero **(4 Marks)**

```
public static double Divide(double a, double b) {
 return a / b;
}
```

b) Change the method given above so that it catches the **IllegalArgumentException** thrown by divide and prints the message "**the divisor is zero**" if it is thrown. **(4 Marks)**

c) Explain the importance of java generics **(2 Marks)**

d) Using Java code fragments show how to declare and instantiate the generic type **(5 Marks)**