(Knowledge for Development)

KIBABII UNIVERSITY
(KIBU)

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

SPECIAL/SUPPLEMENTARY EXAMINATIONS

THIRD YEAR SECOND SEMESTER

FOR THE DEGREE IN
(COMPUTER SCIENCE)

COURSE CODE: CSC 364

COURSE TITLE: ADVANCED JAVA PROGRAMMING

DATE: 10/08/2023   **TIME:** 2.00 P.M. – 4.00 P.M.

INSTRUCTIONS

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY)   [30 MARKS]

a. Discuss the characteristics and benefits of immutable classes.   [3 marks]

b. Describe the concept and use of abstract classes in Java.   [3 marks]

c. Create an exception called "myException" that prints out an error message when thrown.
    Create a block of code that utilizes all three types of invariants and asserts their values

                                                                          [4 marks]

d. Differentiate between upward casting and downward casting in Java.   [3 marks]

e. Write a Regular expression for the language L={Wε{0,1}*|W has no pair of consecutive zeros}

                                                                          [3 marks]

f. What is the significance of Matcher class for a regular expression in java? [2 marks]

g. Using a java signature differentiate between bounded and unbounded wildcards.

                                                                          [3 marks]

h. Discuss the type interface diamond and its usage in Java generics.   [3 marks]

i. Write a java program that reads a set of Integer from a file named **data.txt** saved in a
    document folder in local disk C and print all even numbers to a file called even.txt and odd
    numbers to a file **odd.txt**. Include necessary exception handlers.   [6 marks]

QUESTION TWO   [20 MARKS]

a. Discuss various classes of java.util.regex.   [3 marks]

b. Define a regex for the string with the following properties : string should consist of only
    lowercase and uppercase letters (no numbers or symbols) and the string should end in s

                                                                          [3 marks]

c. What will Collections.sort(items) achieve when used in Collection and ArrayList context.

                                                                          [2 marks]

d. Explain how one can create
    i.   HashMaps and add an item using a java code extract   [2 marks]
    ii. LinkeList add an item using a java code extract   [2 marks]

e. Explain the concept of virtual method invocation as used in java programming.

                                                                          [2 marks]

f. Explain the principle of type casting showing how upcasting and downcasting take place in
    java, use a java code extract to illustrate the process.   [4 marks]

g. Simulate the output for the following code extracts. **[2 marks]**

```
Integer [ ] arr = {1, 2, 3, 4, 5};
String [ ] arr2 = {" just", " a alitle", " bit", " fun"};
printArray(arr);
printArray(arr2);
```

QUESTION THREE [20 MARKS]

a. Explain how sets and HashMaps are implemented. **[2 marks]**

b. Explain package Naming conventions and the process of legalizing package names.

[2 marks]

c. You are provided with the following definition of an enumeration type

```
public enum AcountType
{
Current,
Savings,
Deposit
}
```

    i. Write a java statement that will be used assign one of the AccountType to a variable accoutType in a class called Bank. **[2 marks]**

    ii. What will the code below achieve, simulate its output **[2 marks]**

```
for (AccountType at : AccountType.values())
System.out.println(at+", Value: "+at.name()+", ord:"+ at.ordinal());
```

d. Assume the existence of following java statements:

```
ArrayList<String> Names;
Names = new ArrayList<String>( );
Names.add("Annie");
Names.add("chege");
Names.add("Anthony");
Names.add("Etene");
Names.add("Mbuguah");
```
Simulate the output when Collection.sort(Names) is invoked. **[2 marks]**

e. What is deployment technologies, explain how java plug-in and java web start are used for deploying client side java application on the desktop. **[4 marks]**

f. Write a java statement that will do the following:

    i. Create a file given its path **[2 marks]**

    ii. Delete a file given its path **[2 marks]**

    iii. Copy and move a file given the source of the file and the destination path.

QUESTION FOUR   [20 MARKS]

a. Discuss the concept of linear recursive methods and provide examples.   [2 marks]

b. Explain with a java code extract how input stream and output stream are handled.

   [3 marks]

c. Explain how one can create:

   i.   A linear recursion method   [2 marks]

   ii. Non-linear recursion   [2 marks]

d. Using java statement and an appropriate illustrations, explain the use of the following regular

   expression tokens.   [4 marks]

   i.   [ ]
   ii.   Hyphen (-)
   iii. Dot (.)
   iv.   *
   v.   ?
   vi.   +
   vii. {X,Y}
   viii. {X,}

e. Write a java statement that initializes a Pattern of character defined by a regular expression

   "[A-F]{5,}.*"   [2 marks]

f. Write a java program that reads a sequence of date string in the format "DD/MM/YYY" and

   print out each date in the format "MM/DD/YYY"   [5 marks]

QUESTION FIVE   [20 MARKS]

a. i. Explain the concept of Object Serialization, how can Serializing and Deserializing be done.

   [4 marks]

   ii. Create a class to test serialization class that implements serializable, it should implement the
   following: A static void method that serializes an object, a static void method that deserializes
   an object and static main method that tests the two by moving an object from one to the other.

   [4 marks]

b. Assume the existing of a generic class named Bank with predefined set and get methods for

   account_Name and balance. Write a java statement that will create two objects b1 and b2 of

   type Bank and initializes account_Name to Integer and balance to double in b1 and

   account_Name to String and balance to String in object b2.   [3 marks]

c. Write a program that reads from the user the name of a text file, counts the word frequencies of all words in the file and output a list of words and their frequencies. **[3 marks]**

d. Create a class that does the following:

The class should instantiate a new File class, a new FileReader class, and new BufferedReader class. Read lines by using the readLine() method call., The file path used should be: C:\BlueJ\tempfiles\tempfile.txt and the file should handle errors when the file is not found as well as reading the contents of the file when it is found. **[3 marks]**

h. Using a java signature differentiate between bounded and unbounded wildcards.

[3 marks]