(Knowledge for Development)

KIBABII UNIVERSITY
(KIBU)

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
THIRD YEAR SECOND SEMESTER

FOR THE DEGREE IN
(COMPUTER SCIENCE)

COURSE CODE: CSC 364E
COURSE TITLE: ADVANCED PROGARMMING IN JAVA

DATE: 25/04/2023 **TIME: 2.00P.M.-4.00P.M.** **2HRS**

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

a. What are three main important qualities of Lists? **[3 marks]**

b. The ArrayList class already exists in Java. It contains many methods, briefly state any three of this methods and explain their roles. **[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. Identify the main limitations of the Java.io Package. **[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. Explain when a class can be subclassed or made immutable in java. **[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("Khaoya");
Names.add("Kilwake");
Names.add("Arshley");
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.

[2 marks]

QUESTION FOUR [20 MARKS]

a. Explain forward and backward thinking as applied in recursions **[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]