EASTERN UNIVERSITY, SRI LANKA

FACULTY OF SCIENCE

First Year Second Semester Examination in Science - 2021/ 2022

(Aug./ Sep., 2024)

CS 1032 – Object Oriented Programming (Theory)

Answer All Questions **Time allowed: One hour**

Q1.

a) What is Object-Oriented Programming (OOP), and how does it differ from Structured Programming? [10%]

b) Differentiate between the types of variables with examples. [20%]

c) Explain what overriding is in the context of the Human class below. [15%]

```
class Human {
    public void eat() {
        System.out.println("Human is eating");
    }
}
class Boy extends Human {
    public void eat() {
        System.out.println("Boy is eating");
    }

    public static void main(String args[]) {
        Boy obj = new Boy();
        obj.eat();
    }
}
```

d)

i. Explain what an exception is and what exception handling is. [15%]

ii. Provide descriptions of the keywords below, along with appropriate examples:

   a. catch;

   b. throws;

   c. finally;

   d. try. [30%]

e) A stream is a sequence of data. Explain its types. [10%]

Q2.

a)

i. What are the similarities between a class and an interface?

ii. How does abstraction differ from encapsulation?

b) A class *Human* has four attributes: NIC, age, name, and date of birth. It also has four behaviours: *walk*, *work*, *drive*, and *dive*.

- The NIC attribute is *private*, while all other attributes are *public*.
- The *work* and *dive* methods are *private* and *protected*, respectively, while all other methods are *public*.
- The *drive* method has a return type and takes two parameters: one of type *int* and one of type *String*.
- The *walk* method has a return type and does not take any parameters.
- The *dive* and *work* methods do not have return types.
- The *Human* class has a parameterized constructor that takes a gender parameter.
- The *Human* class has two subclasses: *Student* and *Staff*.
- The *Student* class has an initialized variable stuYear with a value of 2021 and a method named *sing*.
- The *Staff* class has two variables and one method.
  - The *Staff* class has a variable *leaveDays* of type *int* and a method *canTeach* that takes no parameters and returns a *boolean* value.
  - The *setPaper* method has a parameter named count that indicates the number of subjects.

i. Draw a Unified Modeling Language (UML) diagram of the *Human* class according to the instructions provided above.

ii. Write the Java code for the UML diagram created in part (i).

iii. List five types of modifiers.

c) What is static binding? Provide an example.

d) List five file methods and four file operations.

e) Provide the definition of an ArrayList and include code examples for the following operations:

(Hint: You can use any examples to demonstrate the code for the methods below.)

i. Importing the ArrayList class;

ii. Accessing an item;

iii. Setting an item;

iv. Removing all items;

v. Determining the size of the ArrayList.