The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering

Study Programme	: Bachelor of Technology Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	**: EEX3372 - Programming in Python**
Academic Year	: 2021/22
Date	: 13th February 2023
Time	: 09:30-12:30hrs
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **PART A & PART B** questions on **Eight (8)** pages.
3. PART A consists of 20 MCQs & PART B consists of essay types questions.
4. For MCQs, select the most suitable answer. Mark this answer with an **"X"** on the appropriate cage of the given answer sheet.
5. **Answer any Three (3) questions out of the Four (4) essay questions.**
6. Answer for each question should commence from a new page.
7. This is a Closed Book Test **(CBT).**
8. Answers should be in clear handwriting.
9. Do not use red colour pen.

PART A (40 Marks)

1) What is the main advantage of using object-oriented programming?

A. Code reusability
B. Data encapsulation
C. Function overloading
D. All of the above

2) Which of the following is not a fundamental concept of OOP?

A. Inheritance
B. Polymorphism
C. Encapsulation
D. Data types

3) What is the purpose of the init method in Python classes?

A. It is used to initialize class variables
B. It is used to create objects of the class
C. It is used to define class methods
D. It is used to define class properties

4) What is the difference between a class variable and an instance variable?

A. Class variables are shared by all instances of a class, while instance variables are specific to each instance
B. Instance variables are shared by all instances of a class, while class variables are specific to each instance
C. Class variables and instance variables are the same thing
D. None of the above

5) What is the purpose of the @classmethod decorator in Python?

A. It is used to define a method that is bound to the class and not the instance
B. It is used to define a method that is bound to the instance and not the class
C. It is used to define a method that is bound to both the class and the instance
D. It is used to define a method that is not bound to either the class or the instance

6) What is the purpose of the @staticmethod decorator in Python?

A. It is used to define a method that is bound to the class and not the instance
B. It is used to define a method that is bound to the instance and not the class
C. It is used to define a method that is not bound to either the class or the instance
D. It is used to define a method that can be overridden by subclasses

7) Which of the following is not a valid method for a class in Python?

A. init
B. str
C. add
D. hello

8) What will be the output of the following Python code?

```
class Parent:
    x = [1, 2, 3]

class Child(Parent):
    pass

print(Child.x)
Child.x[1] = 4
print(Child.x)
```

A. [1, 2, 3], [1, 2, 3]
B. [1, 2, 3], [1, 4, 3]
C. [1, 4, 3], [1, 4, 3]
D. None of the above

9) What is the output of the following Python code?

```
class A:
    x = [1, 2, 3]
    def __init__(self):
        self.x = [4, 5, 6]

a = A()
print(a.x)
```

A. [1, 2, 3]
B. [4, 5, 6]
C. [1, 2, 3, 4, 5, 6]
D. None of the above

10) What is the output of the following Python code?

```
class A:
    x = [1, 2, 3]
    def __init__(self):
        self.x.append(4)

a = A()
print(a.x)
```

A. [1, 2, 3]
B. [4]
C. [1, 2, 3, 4]
D. None of the above

11) What is the output of the following Python code?

```
class A:
    x = [1, 2, 3]
    def __init__(self):
        self.x = self.x + [4]

a = A()
print(a.x)
```

A. [1, 2, 3]
B. [4]
C. [1, 2, 3, 4]
D. None of the above

12) Which of the following is a correct way to define a subclass in Python?

A. class B(A):
B. class B inherits A:
C. class B extends A:
D. class B < A:

13) What is the purpose of the try-except block in Python?

A. To run a block of code and catch any errors that occur
B. To continuously loop a block of code until a specific condition is met
C. To define a function
D. To import a module

14) What is the purpose of the finally block in a try-except-finally block in Python?

A. To catch any errors that occur in the try block
B. To define a function
C. To run a block of code regardless of whether an exception is raised or not
D. To import a module

15) How do you catch a specific exception in a try-except block in Python?

A. By using the "catch" keyword followed by the exception's name
B. By using the "except" keyword followed by the exception's name
C. By using the "finally" keyword followed by the exception's name
D. By using the "try" keyword followed by the exception's name

16) How do you use a for loop to iterate over a list in Python?

A. for x in list:
B. for x in list():
C. for x in list
D. for each x in list:

17) What is the purpose of the self-parameter in a class method in Python?

A. To specify the class name
B. To pass in additional arguments
C. To reference the instance of the class the method is called on
D. None of the above

18) What will be the output of the following Python expression?
print(round(4.89))

A. 5
B. 4
C. 4.8
D. 4.9

19) What will be the output of the following code?

```
class Dog:
  def __init__(self, name):
    self.name = name
  def bark(self):
    print("Woof, woof!")

dog1 = Dog("Fido")
dog2 = Dog("Buddy")

dog1.bark()
dog2.bark()
```

A. "Fido", "Buddy"
B. "Woof, woof!", "Woof, woof!"
C. "Fido", "Woof, woof!"
D. "Buddy", "Woof, woof!"

20) What will be the output of the following code?

```
class Car:
    def __init__(self, make, model):
        self.make = make
        self.model = model
    def display_info(self):
        print(f"Make: {self.make}, Model: {self.model}")

car1 = Car("Toyota", "Camry")
car2 = Car("Honda", "Civic")

car1.display_info()
car2.display_info()
```

A. "Toyota", "Camry"
B. "Honda", "Civic"
C. "Make: Toyota, Model: Camry", "Make: Honda, Model: Civic"
D. "Camry", "Civic"

PART B (60 Marks) – Select 3 out of 4 questions

1. You are a software developer working on a project that involves processing a large amount of data. The data is stored in a CSV file, and each row represents a single record. Unfortunately, the file is too large to read into memory all at once, so you need to write a script (Python) that reads the file one row at a time and processes the data.

(20 Marks)

a) Explain how you would use a while loop to read the CSV file one row at a time and process the data.
b) Explain how you would use a for loop to read the CSV file one row at a time and process the data.
c) Compare and contrast the while loop and for loop in terms of how they are used to read and process the data in this scenario.
d) Discuss any potential issues or limitations you might encounter when using a loop to process a large amount of data, and explain how you would address them.

2. You are a software developer working on a project that involves creating a system for managing a fleet of vehicles. The fleet includes cars, trucks, and buses, each with unique properties and behaviours.

(20 Marks)

a) Explain (with sample code) how you would use encapsulation to design the class for a car object in this system.
b) Explain (with sample code) how you would use encapsulation to design the class for a truck object in this system.

c) Explain (with sample code) how you would use polymorphism to handle the different types of vehicles in the fleet (cars, trucks, buses) in a single function.
d) Explain (with sample code) how you would use polymorphism to handle the different behaviors (e.g. starting, stopping, accelerating) of the vehicles in the fleet in a single function.

3. You are a software developer working on a project that involves processing a large amount of data from a CSV file. You have written a script that reads the data from the file, performs some calculations, and writes the results to a new file. However, there may be errors that occur during the processing, such as the file not being found or the data being in an unexpected format

(20 marks)

a) Explain how you would use try-except blocks to handle a scenario where the input file is not found. Provide a code sample.
b) Explain how you would use the raise statement to raise a custom exception if the data in the input file is in an unexpected format. Provide a code sample.
c) Explain how you would use the finally block to ensure that the output file is closed, even if an exception is raised. Provide a code sample.
d) Explain how you would use the assert statement to check for any invalid data in the input file and raise an exception if any is found. Provide a code sample.

4. This question is based on the given code block:

(20 Marks)

```
class Vehicle:
    def __init__(self, make, model, year):
        self.make = make
        self.model = model
        self.year = year

    def start(self):
        print(f"The {self.make} {self.model} is starting.")

    def stop(self):
        print(f"The {self.make} {self.model} has stopped.")

class Car(Vehicle):
    def __init__(self, make, model, year, num_wheels):
        super().__init__(make, model, year)
        self.num_wheels = num_wheels

    def honk(self):
        print("Honk honk!")

class Motorcycle(Vehicle):
    def __init__(self, make, model, year, num_wheels, num_handlebars):
        super().__init__(make, model, year)
```

```
        self.num_wheels = num_wheels
        self.num_handlebars = num_handlebars

    def rev_engine(self):
        print("Vroom vroom!")

car1 = Car("Toyota", "Camry", 2020, 4)
moto1 = Motorcycle("Harley Davidson", "Road King", 2019, 2, 2)

car1.start()
car1.honk()
car1.stop()
print(car1.num_wheels)

moto1.start()
moto1.rev_engine()
moto1.stop()
print(moto1.num_handlebars)
```

a) How does the class Car inherit from the class Vehicle?
b) What is the purpose of the super() function in the init methods of the Car and Motorcycle classes?
c) How would you add a new attribute to the Motorcycle class?
d) How would you add a new method to the Vehicle class that is inherited by the Car and Motorcycle classes?
e) What is the difference between the start() and honk() methods of the classes?

End of the paper

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Answer sheet for Part A

Mark a cross "X" on the letter corresponding to your answer

01	A	B	C	D	11	A	B	C	D
02	A	B	C	D	12	A	B	C	D
03	A	B	C	D	13	A	B	C	D
04	A	B	C	D	14	A	B	C	D
05	A	B	C	D	15	A	B	C	D
06	A	B	C	D	16	A	B	C	D
07	A	B	C	D	17	A	B	C	D
08	A	B	C	D	18	A	B	C	D
09	A	B	C	D	19	A	B	C	D
10	A	B	C	D	20	A	B	C	D