Exercise 002

Computer Programming Paradigms

# Task 1:

**What does the term “Computer Programming Paradigm” mean?**

A Paradigm is essentially a way of doing something, or even a way of thinking about doing something. There are different ways of doing almost everything, and Computer Programming is no different. Computer Programming Paradigms describe different styles of programming, or different ways of thinking about programming. These different paradigms guide the thinking process and approach to things such as the program structure, layout, functions and more. There are many different Computer Programming Paradigms and each one has specific benefits and drawbacks.

# Task 2:

**List three computer programming paradigms and explain each in detail.**

Procedural Programming: this is a top-down approach to programming where program code is executed step by step from the top of the program down to the bottom of the program. If the flow of control branches off to any function, it resumes right after the function call in the program. Procedural programming can be easy to understand and implement since it follows a clear sequence of instructions. These sequences can be combined with other control structures, namely selection and iteration, to develop the required complexity within a program. This functionality makes the Procedural programming languages very useful as general-purpose languages which can be used to develop software for almost any requirement.

Object-Oriented Programming: the object-oriented paradigm revolves around objects, as the name applies, which have properties and behaviours associated with them. Objects are instances of classes, which form the backbone of object-oriented programming. These classes are blueprints which can be reused to create objects which inherit the methods and attributes of the parent class. This is useful because it cuts down on code reuse by creating a class once and then making as many new objects as we need without rewriting all the components of the class. It also protects data as access can be controlled by creating public and private methods. Object-Oriented programming is a very popular programming paradigm and can be used to create full-scale complex programs.

Event-driven Programming: in Event-driven programming, the program reacts to events rather than just following through a sequence of commands. These events can be from a user, for example clicking in an application or pressing keys on a keyboard, or inputs or outputs from some other part of a program. A central feature of the event-driven programming paradigm is the event loop, which constantly checks for new events and responds by sending them as messages to an event handler. This paradigm is well suited for real-time system, games, and interactive applications where responsiveness is needed.

# Task 3:

List three advantages and three disadvantages of the Object-Oriented Programming paradigm.

**Three advantages of Object-Oriented Programming:**

* Object-Oriented programming protects data and code by limiting outside access to properties and methods of objects
* Object-Oriented programming can lead to improved productivity since larger applications can be broken down into smaller components and worked on by multiple developers.
* Object-Oriented programming can lead to faster software development since it supports the re-use of code

**Three disadvantages of Object-Oriented Programming:**

* The learning curve for programming correctly in this paradigm can take longer than with other paradigms
* There are some techniques which can be difficult to program correctly and efficiently, such as inheritance and polymorphism
* Programs written with Object-Oriented approach tend to be much larger than procedural programs

# Task 4:

**Why would a global software company, with offices in all the major cities of each continent on the planet, decide to use the OOP paradigm to develop its software.**

A global software company with offices in all the major cities of each continent might use the OOP paradigm for several reasons. Firstly, developers in different cities could work on different modules of the program, since the OOP paradigm facilitates breaking large applications into smaller modules so that developers can work simultaneously on various modules. The OOP paradigm would also help with the overall speed of any projects as it supports code re-use, thereby saving time for developers and the company overall. The OOP paradigm would also be important for controlling access to data, essential when many developers are working on many different parts of a project at the same time. These are some of the reasons why a global software company with multiple offices on every continent would use the OOP paradigm to develop its software.