

Object-Oriented Programming (OOP)



Object-orientation has mainly become mainstream in the world of IT due to the introduction of **object-oriented programming (OOP)**. In this section, an overview of OOP is given and the most popular programming languages are introduced.

Object-Oriented Programming

Object-oriented modelling provides a vehicle to represent the properties, behaviour and interaction of things. In order to implement these models so they can be used through a computer, a programming language is required – these are called object-oriented programming (OOP) languages.

Note: You do not need to know how to use an OOP language for this course; it is useful, however, to understand the concept of OOP.

Procedural/Modular Programming Flow and Control

Most programmers, and possibly you, will have started programming in a procedural manner. When using procedures, sub procedures and modules, control passes back and forward between procedures (functions).

Figure 1 below shows the flow of a procedural/ modular program. Notice the linear control passing from the *Menu* to a game module (*Chess*, *Checkers* or *Back Gammon*) and then when finished back to *Menu*.

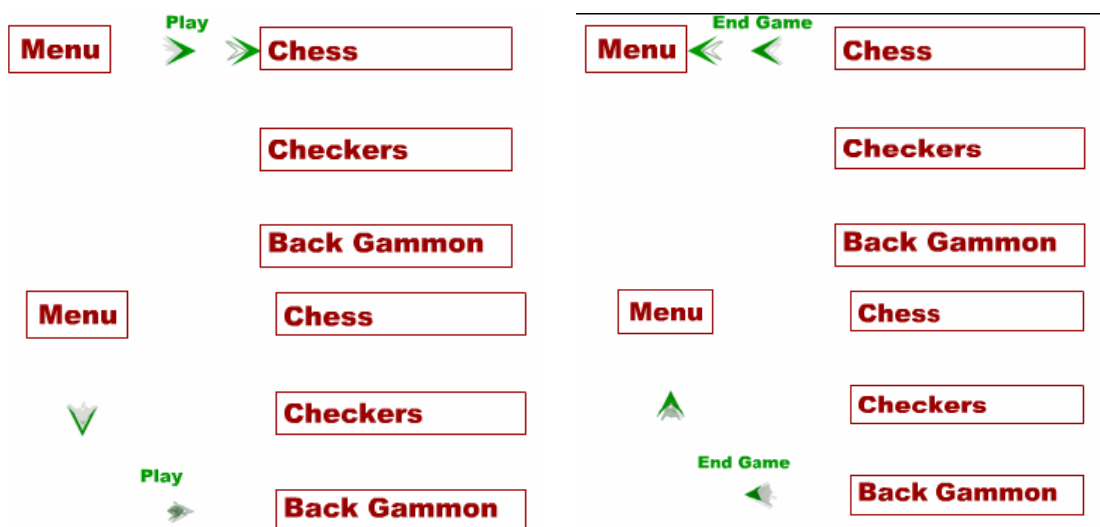


Figure 1: Procedural / Modular Programming Flow

OOP Flow and Control

OOP languages, in contrast to the other programming techniques, have a web of interacting objects sending messages to each other.

Figure 2 shows the flow of an OOP. Notice that control via messages passes interactively and in a non-linear manner between Objects.

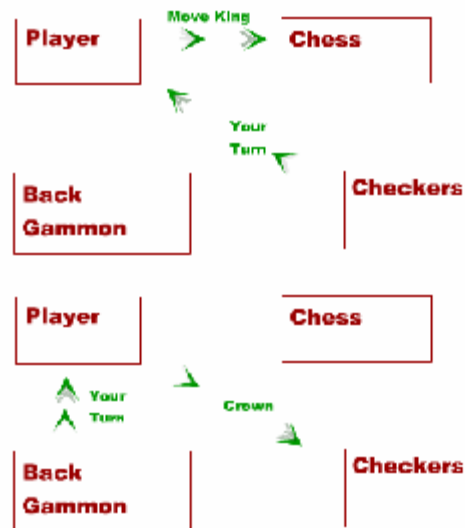


Figure 2: Object-Oriented Programming Flow

Strengths and weaknesses of OOPs

Strengths	Weaknesses
<ul style="list-style-type: none"> • More opportunity for reuse • Models the real world more accurately • Naturalness ("object concept") • Increased quality • Encapsulation and abstraction (higher cohesion/lower coupling) • Easier maintenance • Enhanced modifiability 	<ul style="list-style-type: none"> • Can run slower • Can be complex • Can take more memory

OOP Languages

There is a wide range of OOP languages from which to choose. Different languages support different degrees of object-orientation, but all provide mechanisms to implement the basic concepts, which are covered in this course.

The two most popular programming languages are Java and C++.

Java

Java is one of the purest OOP languages. It was designed from the ground up with objects in mind and is widely used in a range of Internet as well as stand-alone applications. Additionally, the majority of applications running on mobile phones and some PDAs are developed in Java.

C++

One of the most popular programming languages among computer programmers is C. About a decade ago it was extended with object-oriented elements and was then called C++.

The majority of applications running on Microsoft Windows, Mac OS and Linux are written in C++.

Microsoft has recently introduced **C#** (speak: C sharp) which is a popular variant of C++ that has been integrated in the Microsoft.Net Framework.

Visual Basic

One of the most popular programming languages is Microsoft Visual Basic. Visual Basic, like C, was initially designed as a procedural programming language.

In recent versions, object-oriented elements have been added and, since it has been integrated in the Microsoft.Net Framework, it is now widely accepted as an OOP language.



We have been looking at some basic principles of object-oriented programming languages and listed their major strengths and weaknesses. The most popular OOPs have been mentioned.