# OCR Computer Science A Level

## 2.1.4 Thinking Logically

### Intermediate Notes

## Specification

### 2.1.4 a)

- Identify the points in a solution where a decision has to be taken.

### 2.1.4 b)

- Determine the logical conditions that affect the outcome of a decision.

### 2.1.4 c)

- Determine how decisions affect flow through a program.

# Decision making in problem solving

A decision is a result reached after some consideration. When solving problems and designing programs, many decisions have to be made. One of the first and biggest decisions that is made is choosing the approach or paradigm used when developing a piece of software. Another example is deciding how different information is collected.

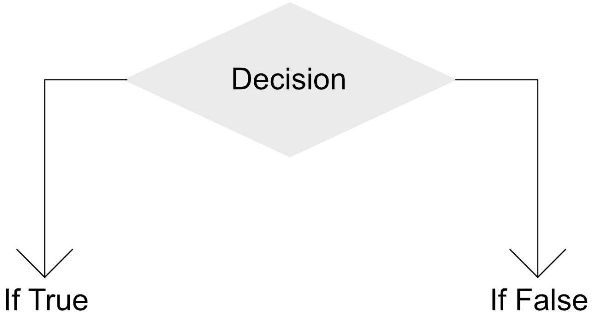
Imagine you were set the task of building a program which switches on a light when a button is pressed. What questions come to mind?

- Which programming paradigm will I use?
- Which programming language will I use?
- What input devices will I need?
- What output devices will I need?
- How can I interact with these devices?

To answer each of these questions, decisions have to be made. To simplify the decision making process, we limit the possible solutions we can pick from. When deciding on a programming language, for example, you should first consider which programming languages it is feasible for you to use and your understanding of the language.

We try to identify where decisions will need to be made early on, as this allows us to gather enough information about our options.

When drawing flow charts, a decision is shown by a diamond shaped icon. This can have two results, yes or no (true/false).



## Conditions that affect the outcome of a decision

When making a decision, there are certain factors which ultimately determine the outcome you choose. There are several key factors that you should take into account:

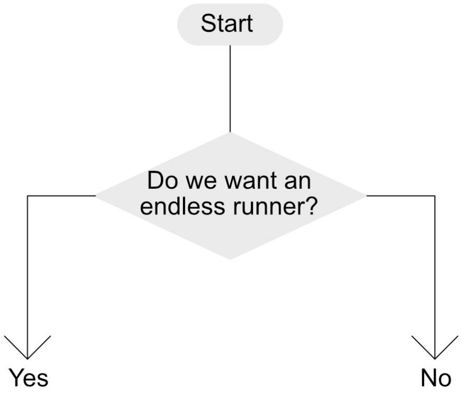
- What is most effective?
- What is most convenient?
- Is this option reasonable?

To make an appropriate decision, you need to evaluate these conditions and order them from most important to least important. By prioritising either effectiveness, convenience or feasibility, it should become clearer how best to achieve your solution.

## Decisions affecting the flow of a program

Decisions are made to determine how different parts of the program are completed. Say we are tasked with designing a simple runner game. We could design the game to be endless, or make the game level-based.

Again, we would evaluate these conditions using the methods described above. It is important to understand that both decisions produce completely different results, and therefore produce different routes through the program.



Thinking logically also involves identifying where decisions need to be made by the user within the program, and planning out the outcomes of the decision made. The program will follow a different route depending on the decision made by the user.