GCSE COMPUTING KNOWLEDGE ORGANISER

2.5 PROGRAMMING LANGUAGES AND INTEGRATED DEVELOPMENT ENVIRONMENTS

2.5.1 LANGUAGES

Characteristics and purpose of different levels of programming language:

- ❑ High-level languages
- ❑ Low-level languages

The purpose of translators

The characteristics of a compiler and an interpreter

HIGH LEVEL LANGUAGES have different purposes - for example, games are often written in **JAVA** while **PYTHON** is used for scripting, **LOW LEVEL LANGUAGES** are used for writing device drivers and programs that interact with the hardware.

REVISION NOTE

You are not expected to be able to program in a low level language, but it is important that you are aware of the differences between low and high level languages and how they are used

	Language	Syntax	Translation	Hardware dependent?	Example

LOW LEVEL	Machine Code	Data and instructions made up of 1's and 0's	Does need to be translated	YES (unique to each processor type)	`11000101 11100101`
					`11001101 11010101`
					`01010111 11001000`

	Assembly Language	Mnemonics/ symbols	One statement translates to one machine code instruction	YES (unique to each processor type)	`MOV1 #5B #6A` `LDA1 #6A`
HIGH LEVEL	Python, JAVA, C++, Visual Basic	Resembles human language	One statement translates into many machine code instructions	NO – transferrable and usable on any computer	`print("Hello, world")`

All programs are executed in machine code – this means that any program now written in machine code needs to be translated into this form. Software called **TRANSLATORS** is used to convert High Level Languages or Assembly Language into machine code. There are two types of translator – **COMPILERS** and **INTERPRETERS.** **SOURCE CODE** is the language that the program was written in. When this is compiled into **OBJECT CODE** it creates an **EXECUTABLE** file that can run on any computer without the use of a compiler.

	COMPILER	INTERPRETER
How does translation take place?	Compiles High Level Language programs into machine code when the program is complete	Translates the program as it is being written – translation will only take place on correct code
Produces object code?	✓	✗

REVISION NOTE

Assemblers are another form of translator which do not need to be covered at GCSE

2.5.2 THE INTEGRATED DEVELOPMENT ENVIRONMENT

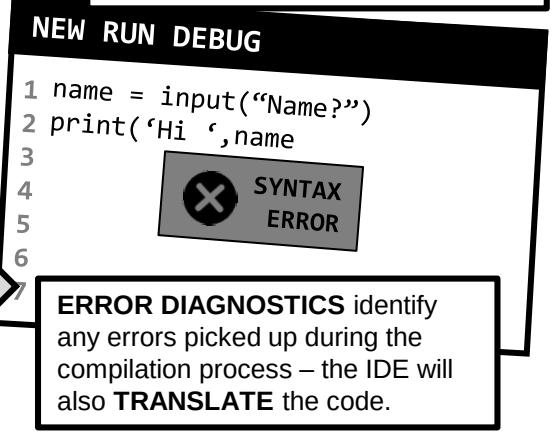
Common tools and facilities available in an Integrated Development Environment (IDE):

- ❑ Editors
- ❑ Error diagnostics
- ❑ Run-time environment
- ❑ Translators

IDE's (INTEGRATED DEVELOPMENT EVIRONMENTS) allow programmers to **WRITE**, **EDIT**, **EXECUTE** and **TRANSLATE** their code

The **RUN –TIME ENVIRONMENT** shows what happens when the code is executed

AN EXAMPLE IDE



The **EDITOR** allows the programmer to enter/edit code and may provide tools like auto-indenting, colour coding variables and commands, and adding line numbers.

ERROR DIAGNOSTICS identify any errors picked up during the compilation process – the IDE will also **TRANSLATE** the code.