

2.5 Translators & Facilities

Keywords & Definitions

Translator: A program that turns a programming language into machine code

Machine Code: The lowest level programming language consisting of 0s and 1s.

Assembly Language: A low level language using mnemonics

Integrated Development Environments: A piece of software to help a programmer develop programs

Assembler: A program that turns assembly language into machine code

Programming Language Generations

1st Generation - Low Level Language: Machine Code

The Generation that "computers understand" - 0011 1100 0101

2nd Generation - Low Level Language: Assembly Language

Translated into machine code for the computer. Uses Mnemonics - LDA 51, STO 52

3rd Generation - High Level Language

Translated into machine code for the computer. Uses English - print, input

High Level Languages

- **One instruction** of high-level code represents **many instructions** of machine code
- The same code will work for **many different machines & processors**
- Code is easy to **read, understand & modify**
- **Must be translated** into machine code before a computer is able to understand it
- You **don't have much control** over what the CPU does so programs will be **less memory efficient** and **slower**

Low Level Languages

- **One instruction** of assembly code only represents **one instruction** of machine code
- Usually written for **one type of machine or processor**
- The programmer needs to **know about the CPU** and how it manages memory
- Code is very difficult to **read, understand & modify**
- Commands in **machine code** can be **executed directly** without the need for a translator - **saves time**
- You control what the CPU does so programs will be **more memory efficient and faster**

High Level Language

Assembly Language

Machine Language (Code)

Hardware (CPU)

So how does our 'HUMAN WRITTEN CODE' get turned into Machine Code?

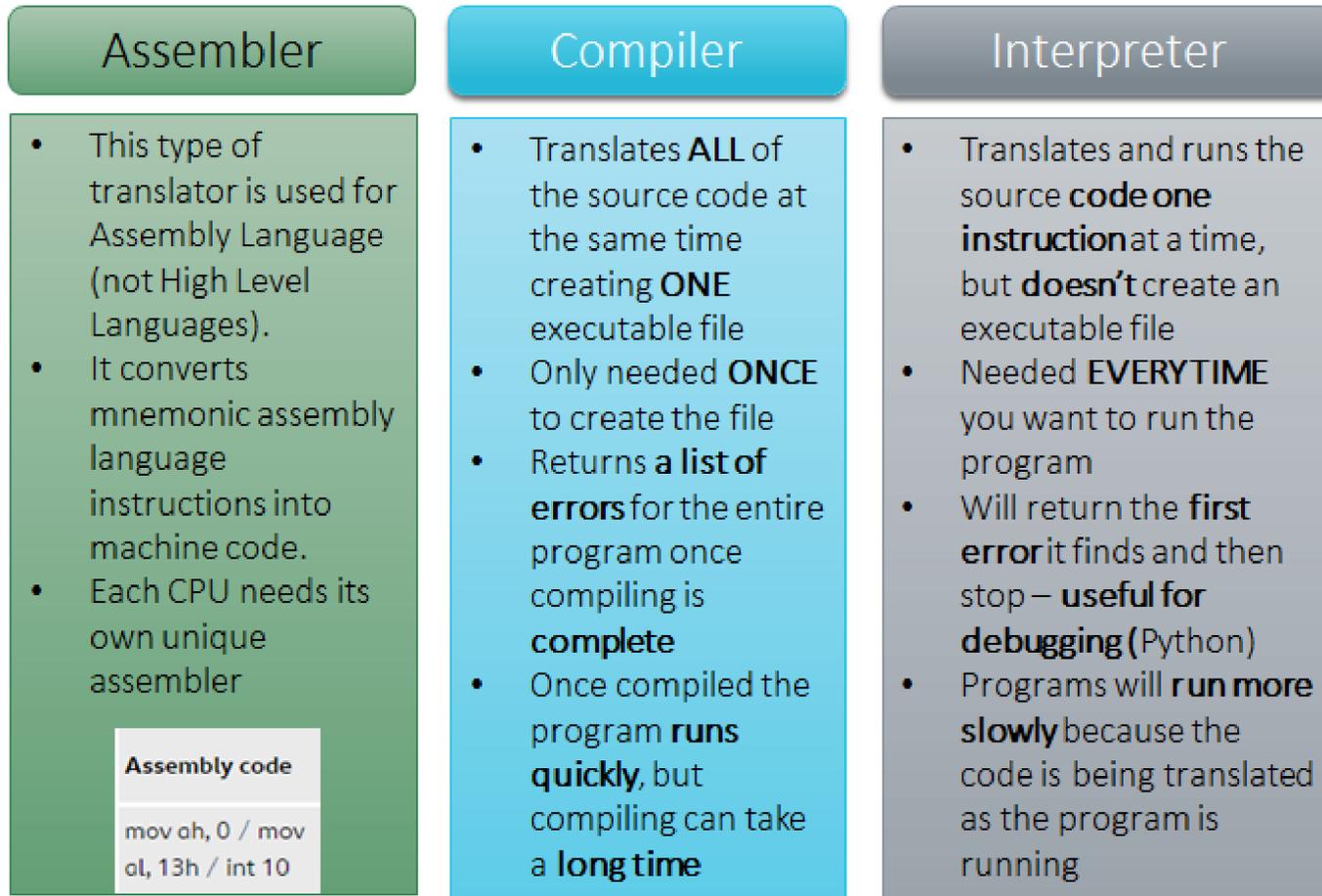
Translators!



2.5 Translators & Facilities

Translators

- Translators convert programming languages into Machine Code
- There are three types of translators
- The type of translator used will depend on which programmable language and IDE you are using



IDE'S – Integrated Development Environments

- An Integrated Development Environment (IDE) is a software package.
- It provides the tools for a computer programmer to develop a software.
- It allows programmers to write their high level code, test it and translate it.
- Most IDEs will have similar features, this is an example of Microsoft Visual Studio IDE

Source Code Editor

- allowing the writing and editing of code
- Most have line numbering and auto-colour coding

Translator

- Translates the source code into machine code

Auto-documentation

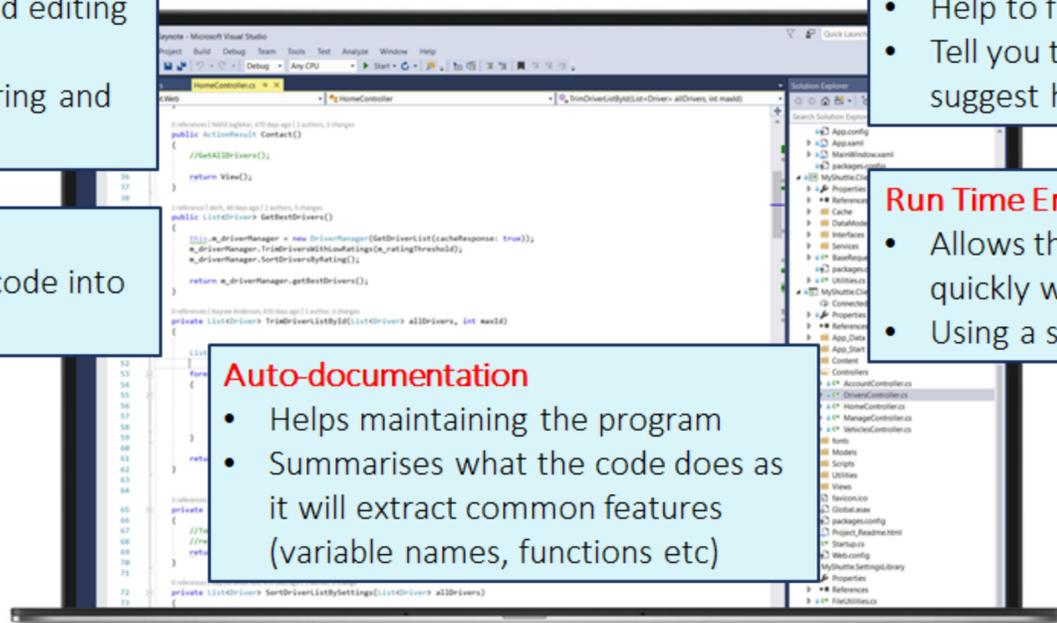
- Helps maintaining the program
- Summarises what the code does as it will extract common features (variable names, functions etc)

Error Diagnostics/Debugging

- Help to find and fix errors
- Tell you the location and often suggest how to fix it

Run Time Environment

- Allows the code to be run quickly within the IDE
- Using a start or run button



World of work links

Programmer, IT Technician, Software Engineer, Teacher, Systems Architecture, Data Engineer, Software Developer

