Programming languages

Machine code:

```
000010 00000 00000 00000 10000 000000
100011 00011 01000 00000 00001 000100
000000 00001 00010 00110 00000 100000
```

Assembly code:

```
MOVE R2, 0
ADD R2, R0, R2
SUB R1, R1, 1
```

High-level language:

```
pWord = input(“Enter the password”).upper()
```

Programming languages

Low level languages: (assembly language & machine code)

Used in embedded systems or CPU processing

- difficult for humans to understand/write
- may only be able to be used with a limited set of systems
- efficient to run - 1:1 equivalence with CPU processes (so quick and less memory needed)
- programmer has total control over components

Programming languages

High level languages:

Such as Python, Java etc...

- can be used on many different systems
- much more powerful set of constructs (selection, repetition, arrays etc…)
- closer to our languages - easier and quicker to learn, use, debug etc...
- need to be converted to machine code - takes CPU time and less efficient to run

Programming languages

Key points:

- Assembly Language and Machine Code are low-level languages
- most programs are written in high-level languages (e.g. Python)
- everything ends up as machine code
- there are advantages to using low-level languages

Translators

All programs need to be translated to machine code

Assembler: converts assembly language to machine code

Compiler: converts HL to machine code. Deals with whole program before it runs any of it

Interpreter: converts HL to MC - translating each line as it executes it (e.g. JavaScript)