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2.5 PROGRAMMING LANGUAGES AND IDES

CONCISE NOTES

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2.5.1 LANGUAGES

Low-level languages

- Machine code and assembly language
- Use binary or mnemonics to represent instructions
- Hardware dependent
- run on one specific type of computer only
- Refer directly to the computer's hardware. Programmers need to understand how the processor works
- Can be run directly by the processor

High-level languages

- Python, C# and Visual Basic are examples of high-level languages
- Use English like keywords like PRINT and WHILE
- Hardware independent – will run on different types of computers
- Abstract the details of the processor
- Must be translated into machine code before they can be run

Translators convert high-level programming code into machine code so that the processor can execute it.

Compilers

- Translate every line of code in a program into machine code and run it afterwards.
- Produce an executable file
- Program can be run again without recompiling; simply run the executable file again
- Executable file can be distributed meaning that users will not see the source code
- Compiled code runs quickly

Interpreters

- Translate one line of code and run that line, repeating this process
- Do not produce an executable file
- Running the program again needs the interpreter to retranslate every line of code
- No executable file to distribute. Would need to share the source code to distribute the program.
- Interpreted code runs more slowly than compiled code.

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2.5.2 THE IDE

An **integrated development environment (IDE)** provides all of the tools that a programmer needs to write and test programs in one place.

4 main tools:

Editor

- A text editor to allow the programmer to enter or modify code in their chosen language.
- May include auto-suggestion of keywords.
- May include pretty printing to colour code keywords and automatically indent code

Error diagnostics

- Tools to allow the programmer to find and fix errors.
- Breakpoints stop the program at a specific point.
- Stepping allows the programmer to run the code from this point one line at a time.
- Variable contents can be checked.

Runtime Environment

- Allows the programmer to run the code from within the IDE.
- The program output can be seen without opening additional programs.
- May involve the use of a virtual machine.

Translators

- Converts the high-level code into machine code to allow execution by the processor.
- IDEs include interpreters or compilers (or both).

If you found this useful, drop a follow to help me out!

THANK YOU!

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