

Key terms

Term	Definition
Integrated Development Environment (IDE)	An IDE is an application used to write programs or create software that has a range of different tools and functions to assist a programmer.
Debugging	A multistep process that involves identifying a problem or error, isolating the source of the problem, and then either fixing the problem or determining a way to work around it.

IDE Tools

Code editor: a text edit area that allows developers to write, edit and save program code. It will provide features that assist with the writing and editing of code, such as:

- Auto-completion of functions and variable names.
- Bracket matching.
- Syntax checks that recognise and highlight any syntax errors in the code.

Runtime environment: an IDE feature that will run and test a program one line at a time.

Other IDE tools include:

- **Translator:** compiles or interprets the code.
- **Auto documentation:** adds annotation to explain the function and purpose of the code.
- **Libraries** of functions that can be imported and used as part of a program.
- **Linker:** allows previously compiled code from libraries to be linked together.
- **Loader:** loads previously compiled code into memory.

Program errors

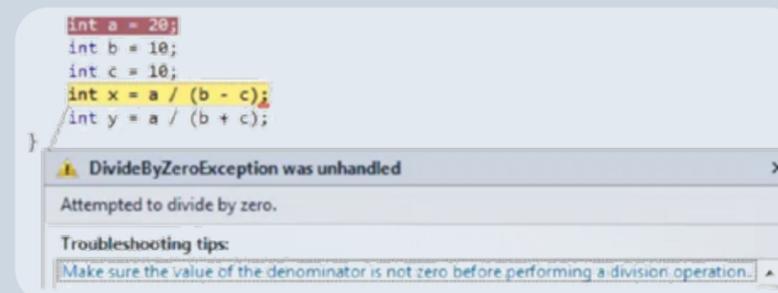
Syntax errors



Translators can only compile or interpret a program if it is syntactically correct. Common syntax errors include spelling/punctuation mistakes, and incorrect indentation (as shown).

Runtime errors

A software or hardware problem that prevents a program from working correctly and may cause the program or computer to crash, e.g. dividing by 0.



Runtime errors may arise from poor programming practice, memory issues and incompatibility of library functions.

Logical errors

Errors where the program runs but produces unexpected or inaccurate results. The errors will not be discovered until outputs are checked during testing. E.g. using the wrong arithmetic operator will not prevent a program from running, but it will cause inaccurate output.

Debugging techniques

Use of an IDE software tool (debugger) that enables the execution of a program to be monitored by stopping, restarting, setting breakpoints, and changing values in memory.

Stepping is a method of debugging which executes the code one line at a time to check for errors. A debugger can also use breakpoints, points in the code where the program can be stopped to see what is happening and check for errors.

Variable watch: using the mouse hover method to inspect variables will establish the value of a variable at a particular point in time. A watch window can be used to continually inspect variables, which will be updated as the code is executed.

Tracing: involves setting trace statements, or print statements, that indicate the flow of execution and interim outputs of a program.

More IDE tools

- **Automatic colour coding:** changes key words, literals and annotation to different colours.
- **Emulator:** will provide an emulator to run the code/app so no physical device required.
- **GUI creator** allows programmers to create a GUI by dragging and dropping controls (buttons, etc) onto a form.
- **Publisher:** facility to package up and deploy program as an easy to install package.

Example AS level exam question

Explain the role of the Integrated Development Environment (IDE) in developing high level language programs.