GCSE OCR

Computer Science
J277

The Integrated Development Environment

Unit 8
Logic and languages

5

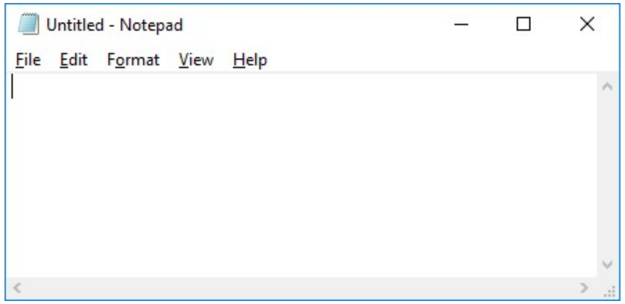
PG ONLINE

Objectives

- Understand the use of an Integrated Development Environment (IDE) to develop programs, including the following:
    - Editors
    - Error diagnostics
    - Run-time environment

Starter

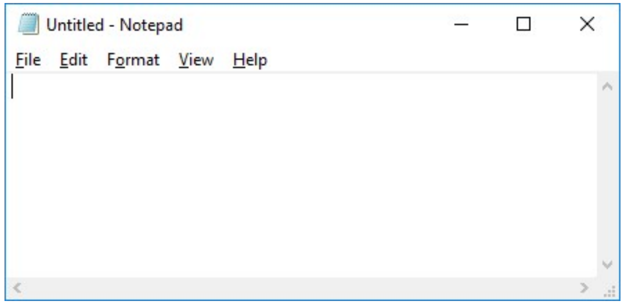
- The simplest way to edit the source code to programs is to use a text editor such as Notepad
  - What problems are there with using such a simple text editor?



Starter

Answers

- There are many problems that such a simple text editor has, including:
  - No line numbers
  - No syntax highlighting (colour coding of different parts of code)
  - No ability to run code directly inside the editor
  - No assistance in debugging code



IDEs

- IDEs are Integrated Development Environments
  - They have a number of tools and features that help programmers when they are programming
- Commonly used IDEs include Visual Studio (for C#, VB and other languages), Eclipse (for C++ and many more) and IDLE (for Python)
  - What features do IDEs provide?

IDEs

- The following screenshot shows some of the features of an IDE
  - Explain what each of these features mean

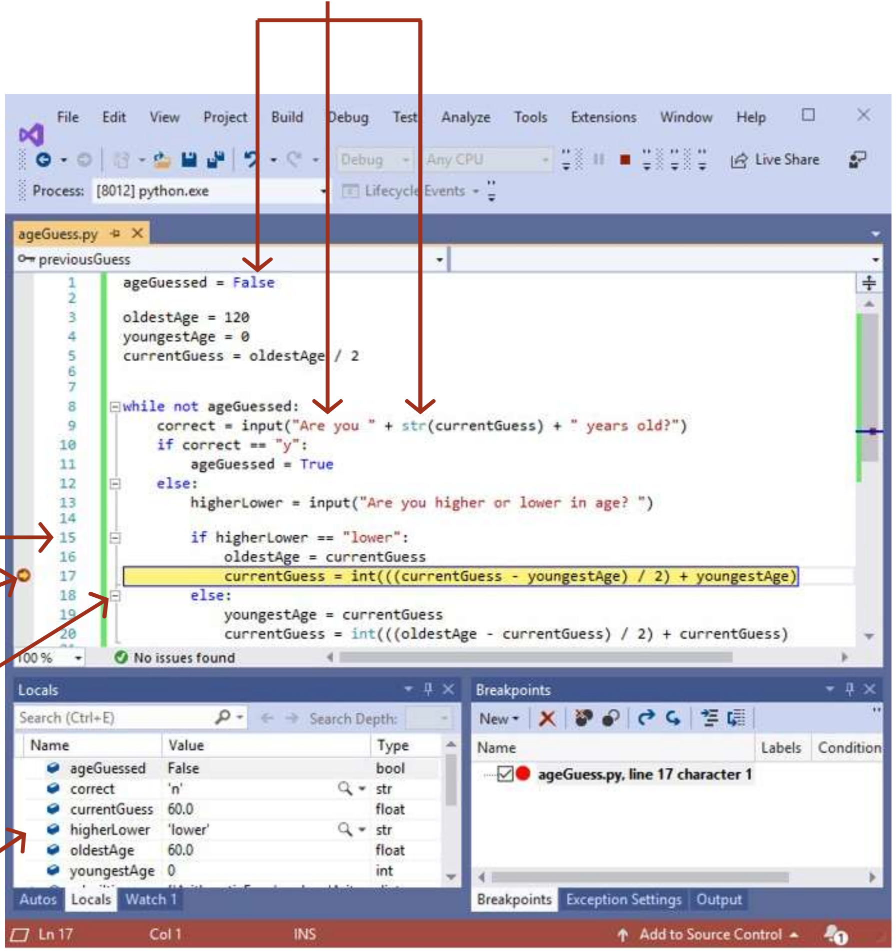
Syntax highlighting

Line numbers

Breakpoints

Code folding

Variable watching



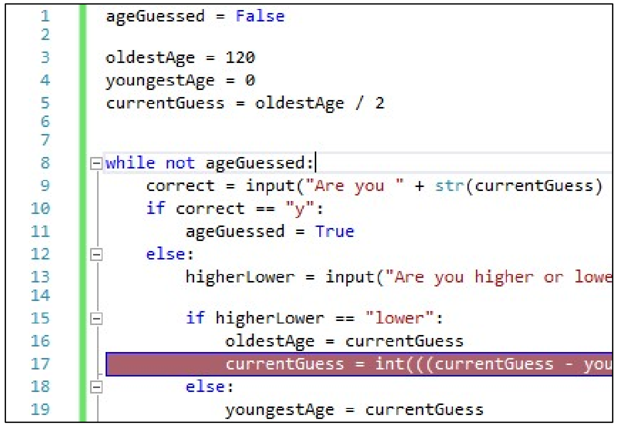
```
ageGuessed = False

oldestAge = 120
youngestAge = 0
currentGuess = oldestAge / 2


while not ageGuessed:
    correct = input("Are you " + str(currentGuess) + " years old?")
    if correct == "y":
        ageGuessed = True
    else:
        higherLower = input("Are you higher or lower in age? ")

        if higherLower == "lower":
            oldestAge = currentGuess
            currentGuess = int(((currentGuess - youngestAge) / 2) + youngestAge)
        else:
            youngestAge = currentGuess
            currentGuess = int(((oldestAge - currentGuess) / 2) + currentGuess)
```

Name	Value	Type
ageGuessed	False	bool
correct	'n'	str
currentGuess	60.0	float
higherLower	'lower'	str
oldestAge	60.0	float
youngestAge	0	int

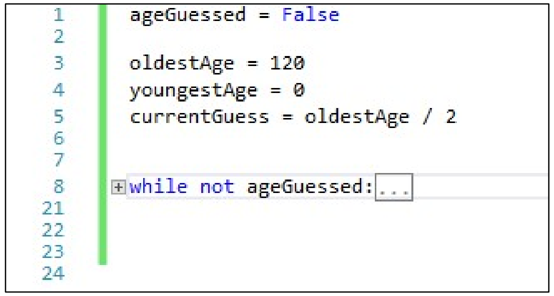
Name	Labels	Condition
☑ ● ageGuess.py, line 17 character 1		

Line numbers

- Line numbers allow a programmer to clearly see each new line of code
  - When errors are found, the line number that they occur on will also be stated
  - In some IDEs, parts of the program that the programmer doesn't need to see can be folded



```
1   ageGuessed = False
2   
3   oldestAge = 120
4   youngestAge = 0
5   currentGuess = oldestAge / 2
6   
7   
8   while not ageGuessed:
9       correct = input("Are you " + str(currentGuess)
10      if correct == "y":
11          ageGuessed = True
12      else:
13          higherLower = input("Are you higher or lowe
14  
15          if higherLower == "lower":
16              oldestAge = currentGuess
17              currentGuess = int(((currentGuess - you
18          else:
19              youngestAge = currentGuess
```

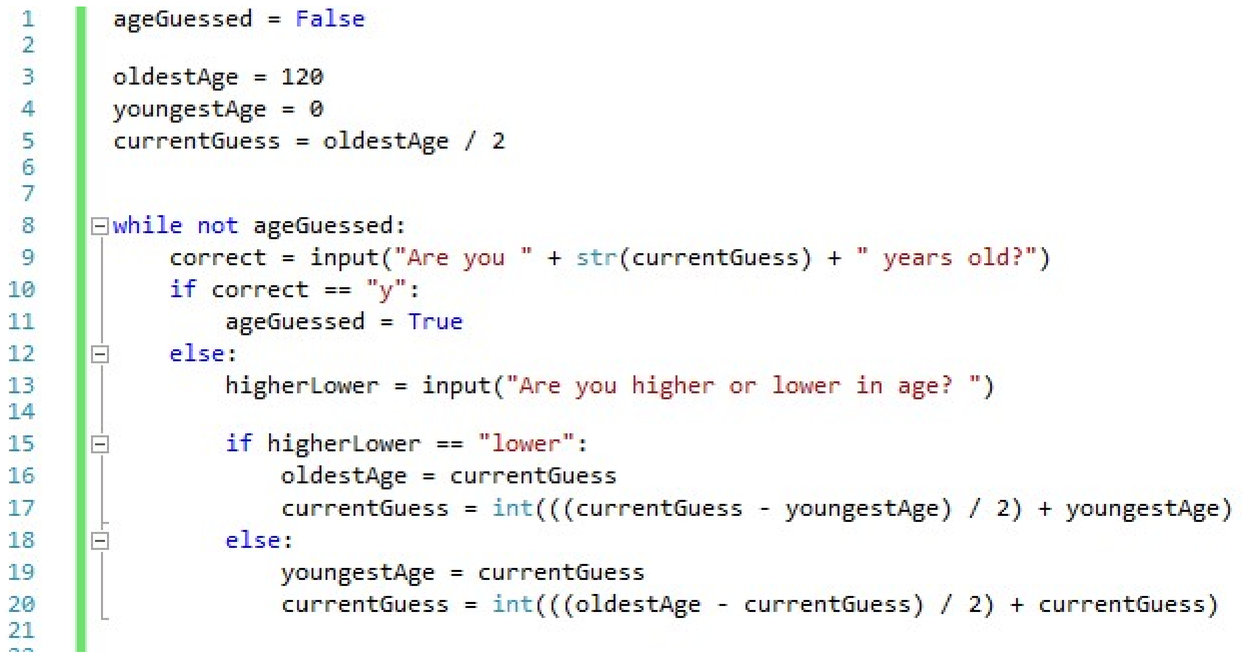


```
1   ageGuessed = False
2   
3   oldestAge = 120
4   youngestAge = 0
5   currentGuess = oldestAge / 2
6   
7   
8   while not ageGuessed:...
21  
22  
23  
24  
```

Notice the line numbers change where the code has been folded

Syntax highlighting

- Syntax highlighting is where the colour of the text changes to show different parts of the program
  - What do each of the colours mean below?

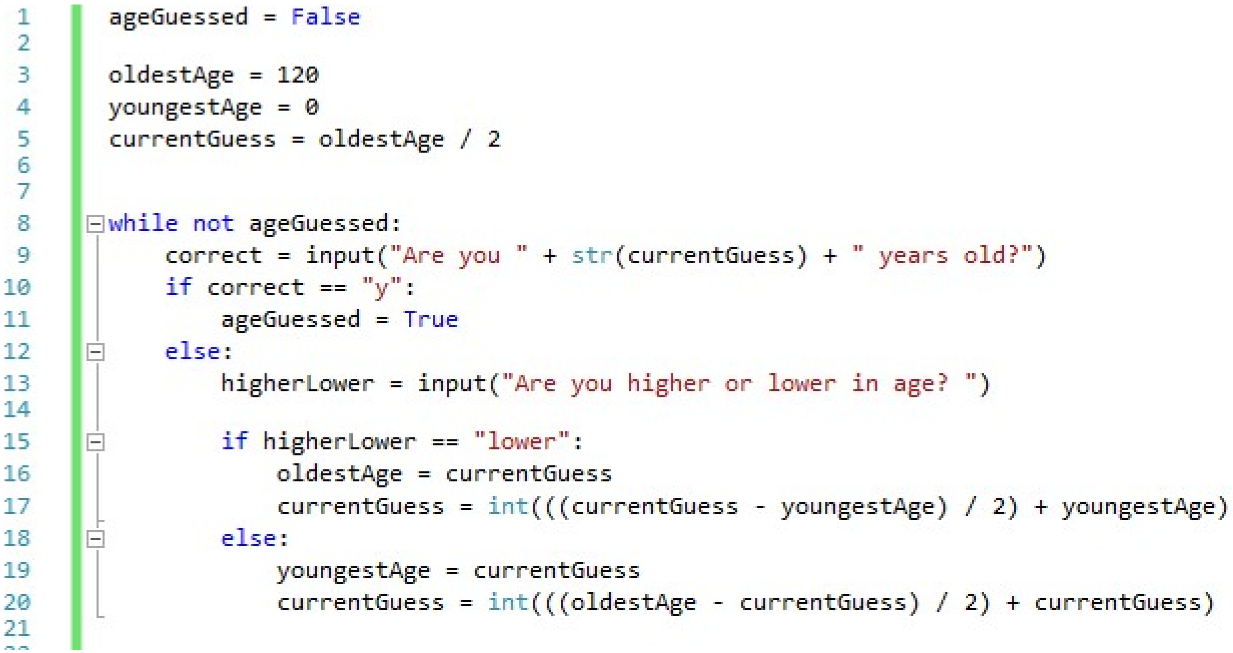


```
ageGuessed = False

oldestAge = 120
youngestAge = 0
currentGuess = oldestAge / 2


while not ageGuessed:
    correct = input("Are you " + str(currentGuess) + " years old?")
    if correct == "y":
        ageGuessed = True
    else:
        higherLower = input("Are you higher or lower in age? ")

        if higherLower == "lower":
            oldestAge = currentGuess
            currentGuess = int(((currentGuess - youngestAge) / 2) + youngestAge)
        else:
            youngestAge = currentGuess
            currentGuess = int(((oldestAge - currentGuess) / 2) + currentGuess)

```

Syntax highlighting

Answers

🟦	Booleans (false, true), Keywords (while, not, if, else)
🟦	Type conversions (str, int)
🟥	Strings – e.g. "Are you higher or lower in age? "
⬛	All other operators, variables and functions names



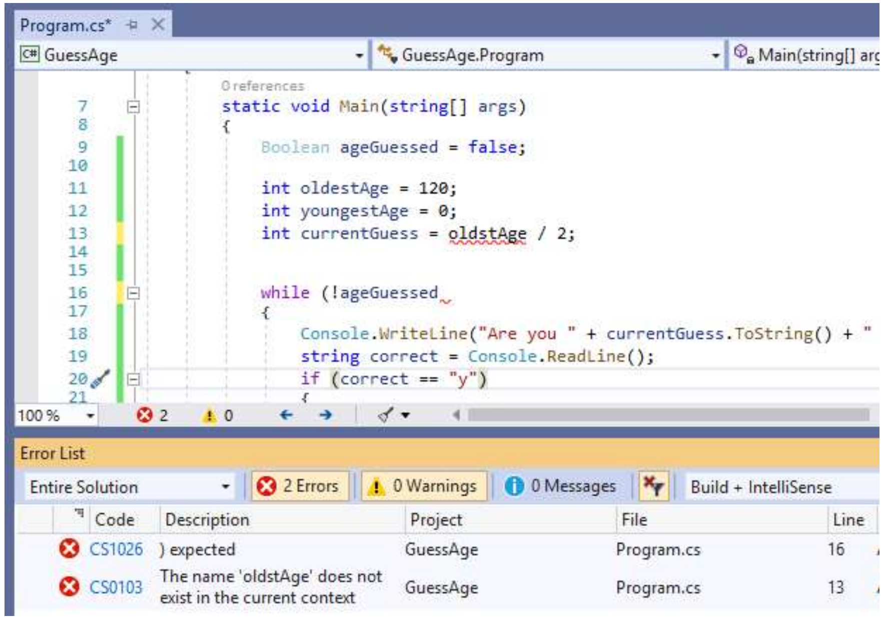
```
ageGuessed = False

oldestAge = 120
youngestAge = 0
currentGuess = oldestAge / 2


while not ageGuessed:
    correct = input("Are you " + str(currentGuess) + " years old?")
    if correct == "y":
        ageGuessed = True
    else:
        higherLower = input("Are you higher or lower in age? ")

        if higherLower == "lower":
            oldestAge = currentGuess
            currentGuess = int(((currentGuess - youngestAge) / 2) + youngestAge)
        else:
            youngestAge = currentGuess
            currentGuess = int(((oldestAge - currentGuess) / 2) + currentGuess)

```

Worksheet 5

- Now complete **Task 1** on **Worksheet 5**

Error diagnostics

- Error diagnostics help a programmer to find where they have made a mistake
    - Errors are identified along with the line number that they occur on
    - The code may be underlined or highlighted to show the error
- This program is written C#
    - With the help of the error diagnostics fix the two errors shown



```
 7  static void Main(string[] args)
 8  {
 9      Boolean ageGuessed = false;
10
11      int oldestAge = 120;
12      int youngestAge = 0;
13      int currentGuess = oldstAge / 2;
14
15
16      while (!ageGuessed
17      {
18          Console.WriteLine("Are you " + currentGuess.ToString() + "
19          string correct = Console.ReadLine();
20          if (correct == "y")
21          {
```

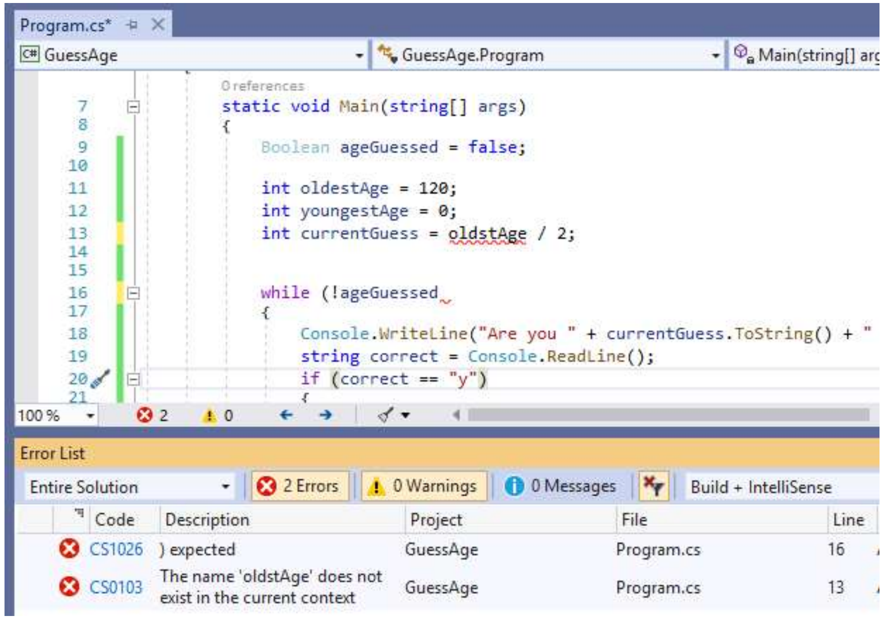
Error List

Code	Description	Project	File	Line
CS1026	) expected	GuessAge	Program.cs	16
CS0103	The name 'oldstAge' does not exist in the current context	GuessAge	Program.cs	13

Error diagnostics

Answers

- The errors show that:
  - A bracket needs to be added to the end of line 16
  - The variable `oldstAge` in line 13 doesn't exist. The programmer should use `oldestAge` which they created in line 11

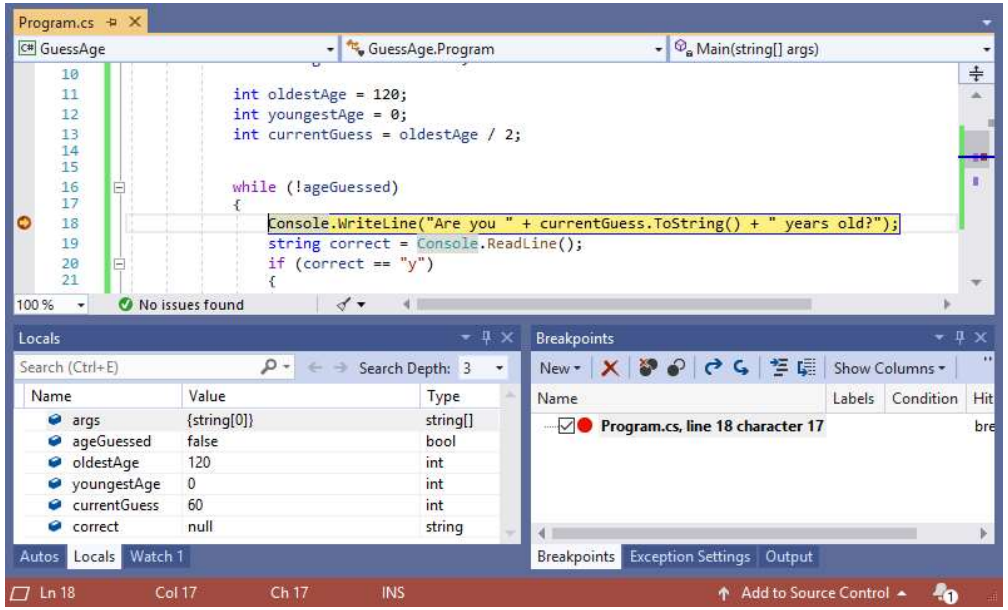


```
 7  static void Main(string[] args)
 8  {
 9      Boolean ageGuessed = false;
10
11      int oldestAge = 120;
12      int youngestAge = 0;
13      int currentGuess = oldstAge / 2;
14
15
16      while (!ageGuessed
17      {
18          Console.WriteLine("Are you " + currentGuess.ToString() + "
19          string correct = Console.ReadLine();
20          if (correct == "y")
21          {
```

Code	Description	Project	File	Line
CS1026	) expected	GuessAge	Program.cs	16
CS0103	The name 'oldstAge' does not exist in the current context	GuessAge	Program.cs	13

Debugging code

- Breakpoints are set by the programmer so that the IDE stops the program mid-way through running
    - The programmer can the step through code line by line
    - They can watch variables as they change
- The breakpoint was set to line 18
    - What do the variables contain at this point?



```
10
11      int oldestAge = 120;
12      int youngestAge = 0;
13      int currentGuess = oldestAge / 2;
14
15
16      while (!ageGuessed)
17      {
18          Console.WriteLine("Are you " + currentGuess.ToString() + " years old?");
19          string correct = Console.ReadLine();
20          if (correct == "y")
21          {
```

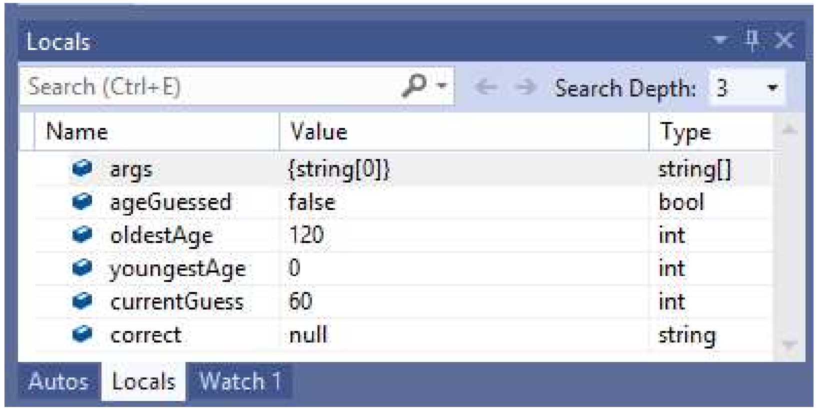
Name	Value	Type
args	{string[0]}	string[]
ageGuessed	false	bool
oldestAge	120	int
youngestAge	0	int
currentGuess	60	int
correct	null	string

Name	Labels	Condition	Hit
☑ ● Program.cs, line 18 character 17			bre

Variables

Answers

- ageGuessed = false
- oldestAge = 120
- youngestAge = 0
- currentGuess = 60
- correct = null (it hasn't yet been assigned a value)
- args = {string[0]}
  These are arguments sent to the program when it is called



Name	Value	Type
args	{string[0]}	string[]
ageGuessed	false	bool
oldestAge	120	int
youngestAge	0	int
currentGuess	60	int
correct	null	string

Run-time environment

- The run-time environment allows a programmer to test their program while it is running
  - If the program crashes the run-time environment can see what happened and give useful information to the programmer
- The run-time environment also means the libraries that come with the programming language and will be available to the programmer to use

Worksheet 5

- Now complete **Task 2** on **Worksheet 5**

Plenary

- With a partner, take it in turns to explain each of the following terms related to IDEs:
  - Editors
  - Line numbers
  - Syntax highlighting
  - Breakpoints, stepping and watching variables
  - Error diagnostics
  - Run-time environment

Plenary

Answers

- **Editors** – Use to write and edit programming code
- **Line numbers** – Give a number to each line of code, this is useful when the IDE refers to lines of code
- **Syntax highlighting** – Different colours for code that has different meanings, such as keywords, strings or variables
- **Breakpoints, stepping and watching variables** – The ability to pause code when running and then run each line of code separately whilst watching the values stored in variables as they change
- **Error diagnostics** – Comments from the IDE that help in finding the cause of syntax errors
- **Run-time environment** – The facility of the IDE that allows programs to be run

Copyright

Licence agreement

PG ONLINE