

2 Aisha manages a team of software developers.

(a) Explain the reasons why it is important that Aisha acts ethically in relation to her team members.

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(b) The team are developing a computer game where the user plays a board game (such as chess) against the computer.

Describe how the computer would use Artificial Intelligence (AI) to play the board game.

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(c) The final game will be released under a licence.

Tick (✓) **one or more** boxes in each row to identify the licence(s) each statement describes.

Statement	Free Software Foundation	Open Source Initiative	Shareware	Commercial Software
The user can edit the source code				
The user must always pay before being able to use the software				
The user can redistribute the software				
The user always gets a trial period				

7 Jennifer is writing a computer program for her A Level homework.

(a) Jennifer uses a program library to help her write her computer program.

Describe how a program library can be used while writing a computer program.

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(b) Jennifer uses an Integrated Development Environment (IDE) to write her computer program.

(i) The IDE allows Jennifer to use both an interpreter and a compiler while creating her computer program.

Describe the ways in which Jennifer can use **both** a compiler **and** an interpreter while developing the program.

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(ii) Identify **two** debugging tools that a typical IDE can provide.

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4 Francis is starting his first job as a software developer for a multinational company.

(a) Francis has been advised to join a professional ethical body.

Describe the benefits to Francis of joining a professional ethical body.

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(b) Francis is shown the software he will be working on. He is unfamiliar with the Integrated Development Environment (IDE) he is required to use.

(i) Describe the ways in which Francis can act ethically in this situation.

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(ii) A typical IDE provides debugging tools to support the testing of a program.

Identify **three** other tools or features found in a typical IDE to support the writing of the program.

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(c) Francis is part of a team writing a program. He finds an error in part of the program that has already been tested. He decides not to tell anyone because he is worried about the consequences.

Explain the reasons why Francis acted unethically in this situation.

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5 A programmer uses an Integrated Development Environment (IDE) to develop a program.

(a) Draw **one** line from each IDE feature to its correct description.

IDE feature	Description
Context-sensitive prompt	Executes one line of the program and then stops
Dynamic syntax check	Underlines or highlights statements that do not meet the rules of the language
Breakpoint	Outputs the contents of variables and data structures
Single stepping	Stops the code executing at a set line
Report window	Displays predictions of the code being entered

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(b) The programmer wants to allow users to edit, improve and redistribute the program.

Identify **two** different types of software licence that the programmer could use.

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- 1 Draw **one** line from each software licence to its correct description.

Software licence

Description

Shareware

A limited version of the software could be released and downloaded by anyone, but users would need to pay to unlock additional features.

Open
Source

A licence **must** be purchased to use the software.

Commercial

Users **cannot** download the software over the Internet.

The original source code is made available for other developers who can then modify and improve the software.

7 This question presents three scenarios.

Tick (✓) **one** box for each scenario to indicate whether you think the behaviour shown is ethical or unethical. Justify your choice.

- (a) Marina has a very short deadline to create a piece of software for a client. Algorithm A is quick to code and simpler to test but has an inefficient run time. Algorithm B is more complex to code and test but has a more efficient run time. She decides to implement algorithm A.

Ethical	
Unethical	

Justification

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- (b) Doug is managing a project for a client that has fallen behind schedule. He asks all members of the project team to work extra hours and to cancel any holiday plans to get the project back on schedule.

Ethical	
Unethical	

Justification

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- (c) Debbie is programming a car safety management system. She thinks that the test plan she has been given is not adequate. She decides to discuss her concerns on a public internet forum.

Ethical	
Unethical	

Justification

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- 3 Ria manages a team of software developers. The team is creating a mobile application game for a client.

Ria wants to ensure that her team works to the ACM/IEEE Software Engineering Code of Ethics.

- (a) Explain the ways in which Ria and her team can ensure that they follow the Code of Ethics in relation to the product and their colleagues.

(i) Product

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(ii) Colleagues

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- (b) Ria's client wants to sell the game for a profit. The client cannot decide which type of software licence to use to distribute the game.

Identify **two** types of licence that Ria could recommend to her client **and** justify the use of each licence.

Licence 1

Justification

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Licence 2

Justification

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