



1.2.2 Open Source & Closed Source

1. Jacob makes use of an open source IDE (Integrated Development Environment).

a) State what is meant by the term 'open source software'.

[2 marks]

- The source code is made available to users.
- The licence permits users to modify/recompile the software

b) Give **one** benefit to Jacob of using an open source IDE rather than a closed source IDE.

[2 marks]

- Can modify the source code to add or change functionality for his needs
- Is likely to be free of cost
- Can recompile to work on different systems
- Can benefit from contributions made by the open-source community
- Can inspect the source code to learn how the software works

2. A gaming company decides to release a new video games console. The console will use a modified version of an open source operating system called Linux.

a) Explain the difference between open source and closed source software.

[4 marks]

- Open source has the source code freely available...
- ... to amend/copy/redistribute/recompile
- Whereas closed source is distributed in binary form only/ the source code is not made available...
- There are licensing conditions restricting the redistribution/ there is no permission to amend the code

b) Explain why closed-source software is commonly distributed as compiled executable code rather than as source code for interpretation.

[2 marks]

- Compilers can translate the source code prior to distribution
- Meaning the user can run an executable program without the source code
- Interpreters translate source code every time the program is run
- Meaning the user needs the source code to run the program





c) Explain how Linux being open source would benefit the games company.

[2 marks]

- This means that a lot of the core functionality they need is already available
- The company can adapt the operating system to meet the specific requirements of the games console
- Potentially saving development time and money

3. Charlie will use database management software to store customers' personal and appointment details. Charlie is considering both open source and closed source database software.

Compare the differences between open source software and closed source software and recommend which type of database software Charlie should use.

You should refer to the following in your answer:

- Cost
- Usability
- Extensibility
- Security
- Support available

[9 marks]

Knowledge:

Cost

Open Source

- Often available at no or low software cost
- May have to purchase maintenance contracts
- Staff training if "non-standard"

Closed Source

- (sometimes) have to pay to license the software
- If paid will (usually) it will come with some level of support

Usability/extensibility

Open Source

- Tends to have a lower focus on UI
- Source code released (under license), can be edited, can be redistributed (under license)

Closed Source

- Professionally developed





- Distributed with a restrictive license
- Only executable/object code is distributed//source code not distributed
- Cannot be redistributed

Security

Open Source

- potentially massive bank of volunteer developers working on the product
- Many of the contributors may not be professional
- Because the source code is publicly available, malicious users can also inspect it for vulnerabilities

Closed Source

- Closed teams of developers
- More work scrutiny for code
- security fixes usually addressed quicker

Support Available

Open Source

- Source code released (under license)
- Source can be edited
- Support may be available through community forums, documentation and other users/developers

Closed Source

- Support may be available from the company producing the software.

Application:

Cost

Open Source

- Lower overheads to company
- Extra staff training and hardware cost could lead to total cost of ownership being higher

Closed Source

- Support from vendor can lead to quicker fixes.

Usability

Open Source

- The ability to edit source code means bespoke functionality can be developed in house
- Lower focus on UI can mean a harder to use product (leading to higher training costs)

Closed Source

- Due to professional development, finish tends to be a higher standard





- As the organisation protects their IP they generally tend to be less buggy as the organisation reputation/business model will rely on it
- Without access to the source code, Charlie would generally depend on the vendor for modifications or additional functionality

Security

Open Source

- Tends to be less secure as more people working on it, not always under rigorous oversight
- No paid developers mean people may not work on security fixes straight away

Closed Source

- Developers work under tighter standards
- Code being scrutinised more will mean less likely to be ship with bugs
- Professional standards lead to quicker turnaround of bugs

Support Available

Open Source

- Editable source code means could self-support
- Open communities mean there is vast amounts of knowledge available.

Evaluation:

Open Source

- Open source would lead to potential cost savings if Charlie looked to self support by using online communities or handling the code herself.
- Open source may be preferable if Charlie has sufficient technical expertise, because the software can potentially be customised and software licensing costs may be lower

Closed Source

- Closed source may be preferable if Charlie prioritises ease of use and direct vendor support, particularly if she does not have the technical skills to maintain or modify the software herself
- Charlies would have a legal obligation to the data stored for her business.
- Closed source tighter security may strengthen this
- Charlies business will rely on the uptime of her system. Professional support offered by the developers may mean less downtime in the case of software issues.

