ANSWERS

Answer 1

4(a)(ii)	**1 mark** per action to **max 2** For example: • Prepare an induction • Invite Sophie in before starting • Introduce Sophie to the team • Give Sophie a mentor	**2**
4(a)(iii)	**1 mark** only e.g. • Prepare a greeting/introduction • Provide structured support • Invite Sophie to social event(s) before/at the start to meet people	**1**
4(b)	**1 mark** per bullet point to **max 3** • Sophie is confirming that she understands the code of conduct • To make sure Sophie knows what behaviour is expected of her • To make sure Sophie understands there may be consequences of some actions • To ensure all employees adhere to the same standards	**3**

Answer 2

4(c)(i)	**1 mark** per benefit to **max 2** • She can charge a fee for the game • She retains the copyright • ... so, the game cannot be re-distributed by a third-party without her permission	**2**
4(c)(ii)	**1 mark** per benefit to **max 1** • Potentially better support, as she is charging a fee • Likely to have fewer bugs / less prone to malware than if distributed under other licences e.g. open source • Redress available if the game does not function correctly	**1**
4(c)(iii)	**1 mark** per bullet point • They can check it works // check if it meets their requirements • ... without having to paying a fee if it does not	**2**

Answer 3

2(a)	**1 mark** for each correct term □ Commercial Licence □ Free Software Licence □ Shareware Licence □ Open Source Licence	**4**

Answer 4

4(a)	**1 mark** for naming a principle, **1 mark** for description to **max 3 · 2** □ Product □ Software engineers shall ensure that their products and related modifications meet the highest professional standards possible. □ Judgement □ Software engineers shall maintain integrity and independence in their professional judgement. □ Management □ Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance. □ Profession □ Software engineers shall advance the integrity and reputation of the profession consistent with the public interest. □ Colleagues □ Software engineers shall be fair to and supportive of their colleagues. □ Self □ Software engineers shall participate in life-long learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.	6

Answer 5

2(d)	**1 mark** per bullet point to **max 3** For example: He should ... □ ...Keep the client's personal data private □ ...Involve the client in the development // ...Communicate with the client □ ...Provide the solution that the client asked for □ ...Keep the project running on time // budget □ ...Keep the client informed of any problems/delays	3

Answer 6

5(a)	**1 mark** per bullet point to **max 2** □ Encryption □ Assign a unique code so it will not install without this // product key □ Limit the number of times that version of the software can be installed □ Set a time limit within which the software must be installed	2
5(b)	□ Provide an .exe file // Compile the source code // Use a compiler	1
5(c)(i)	**1 mark** per benefit to **max 2** □ So that she can sell the software for a fee // make money from the software □ A commercial licence prohibits unauthorised/further copies being made and/or distributed □ A commercial licence prohibits any changes to the software	2
5(c)(ii)	**1 mark** per bullet point to **max 2** □ Open Source □ Free Software □ Shareware □ Freeware	2

Answer 7

3(a)	**1 mark** per bullet point, **max 2 marks** per licence Open Source • The source code is released with program • Users can edit the source code to suit their needs • Users re-release their version under the same terms • Can be cost-free but may also need payment Shareware • Users get a free trial of the software • … which may be limited in features • No access to source code // Program cannot be edited • Then they have to pay / sign-up after the expiry date // Then they have to pay / sign-up to get full functionality // Then they have to pay / sign-up to stop unwanted pop-ups, etc.	**4**
3(b)	**1 mark** per bullet point to **max 2 marks** for chosen licence **Open Source** For example: • Hugo does not have to set up ways to take funds • Others may enhance / improve the program • Hugo can charge a fee for the App Or **Shareware** For example: • Hugo can charge for the App • Not giving away the code/people can't copy the code • … Hugo gets the sole recognition for the program • Possible legal consequences if someone does copy the code • If users need to sign up, their data can be used for marketing etc. • Customers have peace of mind that the software hasn't been maliciously edited / bugs introduced	**2**

Answer 8

5(a)	**1 mark** per bullet point for each justification, to **max 2** **Either** Unethical • Work belongs to the company it was created for // copyright • … Kevin cannot use it without permission • It reduces the integrity of the person / profession / new company • Reference to IEEE standards in context **Or** Ethical • The program code could be open source • Kevin might own the copyright of code • Kevin may have permission to use the code • Reference to IEEE standards in context	**2**

5(b)	**1 mark** per bullet point for each justification, to **max 2** **Either** Unethical • Nadya has accepted a role / work she knows she cannot do • This reduces the integrity of the person • She may let down the new organisation who are expecting her to be able to do the work • Reference to IEEE standards in context **Or** Ethical • She is taking steps to prepare for the role • … Without expecting the company to do it • Nadya may have told the company that she didn't know the languages but that she would learn them • Reference to IEEE standards in context	**2**
5(c)	**1 mark** per bullet point for each justification, to **max 2** **Either** Ethical • The individual works as part of the team … • … therefore, the team should / will get the credit • Maria is not lying about who produced it • Reference to IEEE standards in context **Or** Unethical • Maria should identify who / where the idea originated • It prevents the individual getting recognition • Maria is not being supportive of the individual • Reference to IEEE standards in context	**2**

Answer 9

5(a)	**1 mark** per bullet point for each justification, to **max 2** **Either** Unethical • Noah's work may be confidential • Wendy shouldn't claim someone else's ideas / work as her own • She is bringing the profession into disrepute • Reference to IEEE standards in context **Or** Ethical • The code could be open source • Wendy may have permission from Noah • Wendy isn't copying the code, just getting ideas • Reference to IEEE standards in context	**2**

5(b)	**1 mark** per bullet point for each justification, to **max 2** **Either** Unethical • Amit has a responsibility to his company • He should have taken it to the police rather than putting it on the Internet • He has a signed agreement to say he will not give anything away • Reference to IEEE standards in context **Or** Ethical • Amit is acting in the public interest • Amit may not have actually signed the confidentiality agreement • If acting illegally, the multinational company should be brought to justice • Reference to IEEE standards in context	**2**

5(c)	**1 mark** per bullet point for each justification, to **max 2** **Either** Ethical • It might save people's jobs • Farah is acting in the best interest of her company • Reference to IEEE standards in context **Or** Unethical • Farah has a responsibility to act in the best interest of her client • It could give her company a bad reputation • Reference to IEEE standards in context	**2**

Answer 10

3(a)	**Either** Ethical • He is booking the holiday in his own time / lunchtime // he is self-employed • He has been given permission • Reference to IEEE in context **Or** Unethical • Should not use company computer for personal use • Should be working whilst at work • Reference to IEEE in context	**2**
3(b)	Unethical: **Max 2 marks** from • Company will get a bad reputation • Should be supporting his colleague • Reference to IEEE in context	**2**
3(c)	**Either** Ethical • She is supporting her colleague • Working in the best interests of the company • Reference to IEEE in context **Or** Unethical • Praising one team member instead of the whole team • Others in the team may also have contributed, so she is not being supportive of the whole team • Reference to IEEE in context	**2**

Answer 11

5(a)(i)	**1 mark** per bullet point, **max 2** • Restricted use • Source code not provided // source code protected • Anyone can purchase/download if agree to the terms • Limited number of installations allowed // Software key needed to install	**2**

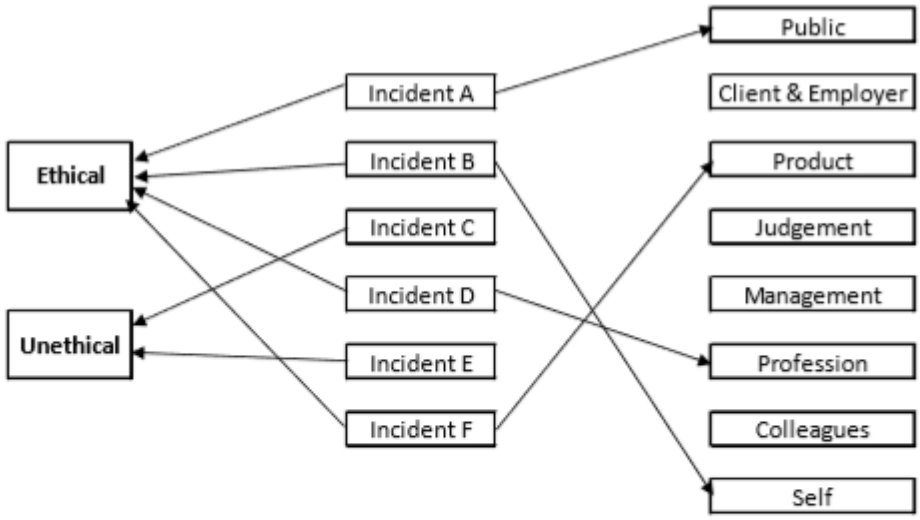
5(a)(ii)	**1 mark** for name and **2 marks** for description **Either** Open Source • The source code is released with the program • Users can change / edit the source code to enhance the game • Users can re-release the game under the same terms // the game might spread more easily **Or** Shareware • Users get free trial or limited access for set time • Users do not have access to the source code // source code may not be edited • At end of trial period, users may have to pay or register to continue using the game // Can get people 'hooked' and then charge a fee **Or** Freeware • There is no fee for the game • The game could be copyrighted • Modification, re-distribution or reverse engineering of the game without permission is prohibited	3

5(b)	**1 mark** per bullet point, **max 3** • Firewall / proxy • Encryption • Username and Password • Physical security • Biometric authentication // by example • Two-step authentication // by example • Anti-malware	3

Answer 12

6(a)	**Two marks** from: ▯ A system of moral principles ▯ That guide behaviour / decision making ▯ Based on philosophical / religious views ▯ By example, e.g. respectful and considerate behaviour	**Max 2**
6(b)	**One mark** for identifying the issue **One mark** for correct principle **One mark** for possible action **Max 2** issues (2 × 3 marks) 1 Uncomfortable with one of his colleagues Client and Employer // Management / Colleagues // Judgement // Self For example: Team building exercises // arranged meeting 2 Unfamiliar with programming language Self // Client and Employer //Product // Profession // Colleagues For example: Undergo training 3 Visit to unfamiliar workplace Client and employer // Management // Judgement // Profession // Colleagues For example: He should speak to his manager to discuss situation	**Max 6**

Answer 13

5		
5(a)	Mark as follows: **Unethical:** C and E 1 Mark **Ethical:** A,B, D and F 1 Mark	**2**
5(b)	Mark as follows: A – Public interest 1 Mark B – Self 1 Mark D – Profession 1 Mark F – Product 1 Mark	**4**

Answer 14

Description	Open source	Shareware	Commercial
Software is purchased before it can be used			✓
Source code comes with the software	✓		
Software is provided free on a trial basis		✓	
The software can be modified by the user	✓		

Answer 15

One mark for identifying the principle, **one mark** for an example that is in the context of this scenario.

Maximum of two marks per principle. **Maximum of three** principles. **[6]**

- PUBLIC / Software engineers shall act consistently with the public interest.
  - Example in context
- CLIENT AND EMPLOYER / Software engineers shall act in a manner that is in the best interests of their client and employer (consistent with the public interest.)
  - Example in context
- PRODUCT / Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.
  - Example in context
- JUDGEMENT / Software engineers shall maintain integrity and independence in their professional judgment.
  - Example in context
- MANAGEMENT / Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.
  - Example in context
- PROFESSION / Software engineers shall advance the integrity and reputation of the profession (consistent with the public interest).
  - Example in context
- COLLEAGUES / Software engineers shall be fair to and supportive of their colleagues.
  - Example in context
- SELF / Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.
  - Example in context

Answer 16

3 **(a) Two** from: **[2]**

- The source code comes with the software.
- The user can edit the source code.
- Once edited, the software is re-distributed with the changes.

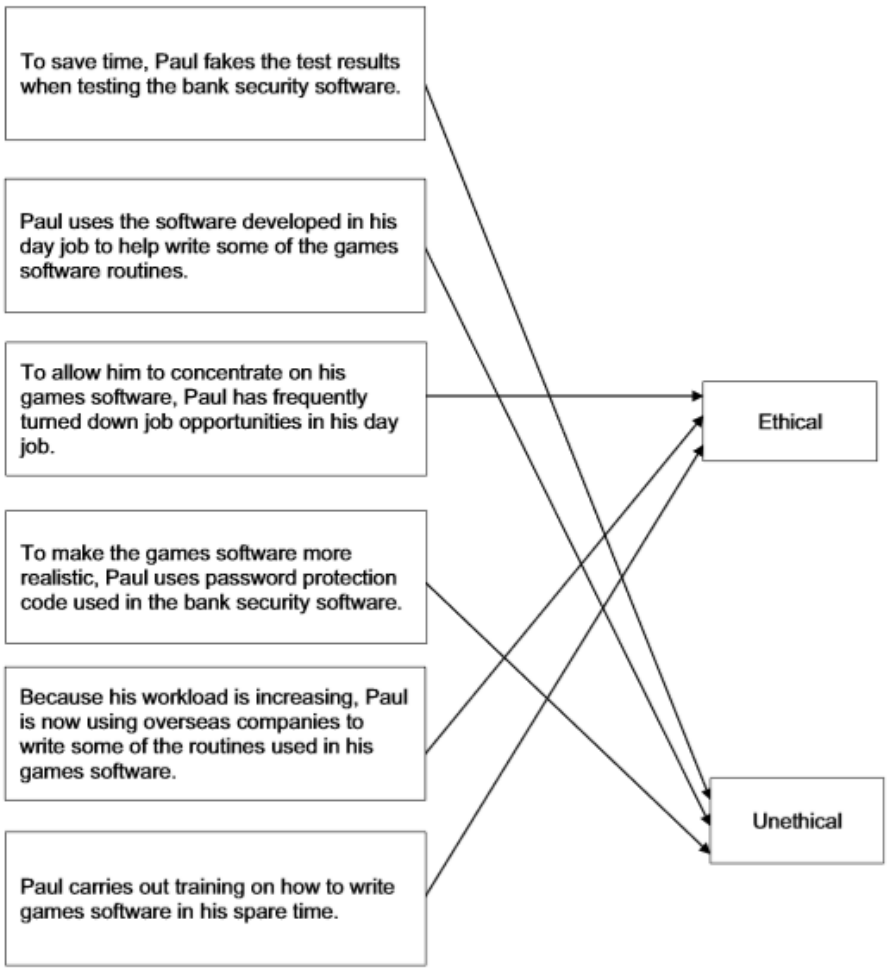
(b) Two from: **[2]**

- The software is purchased.
- With a **licence** which restricts the number of users / possible time period for use.
- The program code for the software cannot be edited.

(c) Four from: **[4]**

- Support / training is readily available so help can be accessed if needed.
- More robust software / fewer bugs as it has been tested more thoroughly/by more users.
- Forums / user groups will exist for popular software.
- Software upgrade path likely to be available (at minimal cost).
- Manufacturer develops patches that can be automatically downloaded.
- Compatibility is inbuilt for other commercial software.

Answer 17



Answer 18

5 **One mark** for each correctly placed tick.

Activity	Ethical	Unethical
Gives away passwords used in the intruder detection software		✓
Uses source code developed at the software house for the software he develops for his own company		✓
Insists that staff work to deadlines	✓	
Turns down training opportunities offered by his employer		✓
Writes and sells software that reads confidential data from client computers		✓
Fakes test results of safety-critical software		✓
Has the software applications developed overseas for sale in his own country	✓	

[7]

Answer 19

10 (a)

Question	True	False
Custom-written software takes a long time to develop	✓	
Custom-written software isn't fully tested		✓
Custom-written software won't have any technical backup		✓
Off-the-shelf software is usually cheaper because costs are shared	✓	
Off-the-shelf software is always compatible with other software		✓

[4]

(b) 1 mark for each benefit + 1 mark for a description

off-the-shelf:

- off-the-shelf software probably has an already trained work force
  - therefore training costs are saved
- off-the-shelf software has many user groups/blogs to gain advice/help
  - therefore more likely to get help if a problem occurs
- a wide diversity of users ensures off-the-shelf software is fully tested under a number of different scenarios …
  - less likely to encounter problems
- version xxx is probably already on the market
  - upgrades will become available throughout the life of the software without having to pay for any further development

custom-written:

- custom-written software does not contain unwanted features
  - therefore easier to use and more efficient running
- custom-written software can be written to interface with all the company's existing software
  - off-the-shelf software will only be tested against widely available software; the company may have specialist software on its system which will not have been tested with off-the-shelf software **[4]**

Answer 20

(c) 1 mark for off-the-shelf feature and 1 mark for custom-written feature:

Off-the-shelf software:

- available straight away
- less expensive since costs shared by other users
- network of users / discussion groups / more training options
- more likely to be fully tested in a number of different scenarios
- more likely to be compatible with other software

Custom-written software:

- time to develop the software from scratch
- will only meet the demands of the user / no unnecessary features
- need to rely on software developers if a fault occurs / requirements change
- only available to a single organisation

[2]

Answer 21

(a) Any **four** points from:

- training will be necessary (this can be expensive for the company and it also takes the workers away from their job while undergoing training)
- possibility of redundancies (for reasons above) but also because the new computer systems may require fewer staff to do the work
- greater productivity – production of work will take less time (e.g. CAD software allows modifications to drawings to be made in a fraction of the time manually)
- possibility of working from home (can email work, use VoIP etc.)
- better working environment for staff (less noisy)
- creation of new jobs….all computer related (e.g. computer maintenance) **[4]**

(b) 1 mark for each benefit and 1 mark for each drawback

off-the-shelf

benefits

- usually less expensive since the development costs can be spread over many purchasers of the software
- they are frequently more sophisticated since the money generated from large sales (often global) allows more development work to be done
- there will usually be ***user groups*** who can give help and support
- the ability to export/import files into/from other packages is often easier since they are more likely to be compatible
- the software is available immediately – there is no need to wait while it is being written and developed
- the software is usually relatively "bug free" since it has been highly developed using feedback and targeted user groups.

drawbacks

- the software tends to be over-complex since it tries to cover as many aspects as possible; the average user will probably only use a small fraction of the features available
- because of the unwanted features, the software tends to be over-complex in use
- the software may not exactly fit the requirements of the user and may be a compromise
- any major problems for a user (requiring a re-write) will not be resolved quickly – a software re-write may cause problems for other users and may even cause software instability

custom-written

benefits

- these are designed and written to meet the user's specific requirements; consequently, they will be more efficient and won't contain unwanted features
- the writers of the software can develop it so that it will not interfere with other software being used by the company; this will avoid any software clashes
- it is frequently easier to use since the software can be written in conjunction with the end users in mind (the users get exactly what they need)
- any modifications needed (e.g. due to changes in the business requirements) can be done more easily and more quickly since the changes are probably specific to the company
- usually better customer support since the users can be in direct contact with the software designers/writers

drawbacks

- there is much greater dependence on the software company; e.g. if they go out of business then future support may be non-existent
- it is unlikely to be as well developed as "off the shelf" software
- it is usually far more expensive since the development costs have to be met fully by the user
- the development time may be quite lengthy, particularly if the application is unique or complex
- in some ways, the company takes a gamble – the final package may not actually meet the user requirements especially if the development time is long and the company's needs have changed in the meantime **[4]**