

AS • Cambridge (CIE) • Computer Science

🕒 36 mins 🗋️ 7 questions

Exam Questions

Ethics & Ownership

Professional ethics / Legal frameworks / Artificial intelligence (AI)

- 1 A car park system uses a camera to record the registration number of each car as it enters and leaves the car park.

Explain how artificial intelligence is used in the car park system to identify the car's registration number.

Answer



Mark Scheme and Guidance

1 mark for each bullet point (max 4)

e.g.

- It uses image recognition
- The pixels of each image from the camera are stored
- ... and matched to the expected shape/size/colour of registration number
- It uses optical character recognition
- The pixels within the registration number area identified are analysed
- ... and compared to expected characters/letters/numbers

(4 marks)

2 (a) Software is distributed with a licence.

Give **two** benefits of distributing software using a shareware software licence.

Answer



Mark Scheme and Guidance

1 mark for each bullet point (**max 2**)

- The user can test/trial the program before purchasing to see whether it meets needs
- There is no initial cost
- Users who try the software may spread the word so the developer gets more custom
- The developer can get feedback to improve the program

(2 marks)

(b) Give **two** benefits of distributing software using a commercial software licence.

Answer



Mark Scheme and Guidance

1 mark for each bullet point (**max 2**)

- The owner/developer can earn a fee
- Comprehensive support is usually offered so problems can be easily solved
- The software is usually well tested so few bugs

(2 marks)

3 (a) A computer programmer is learning about the importance of acting ethically at work.

Explain the reasons why the computer programmer needs to act ethically towards colleagues and the public.

Answer



Mark Scheme and Guidance

1 mark for each bullet point **max 2** for public **max 2** for colleagues

e.g.

Colleagues:

The programmer should:

- Treat colleagues fairly and avoid acts of discrimination
- Be prepared to accept / offer critique
- ... so that technical work can be improved
- Credit the contributions of colleagues
- ... so that they feel valued / respected
- Help / train colleagues
- etc.

e.g.

The public:

The programmer should:

- Maintain the health, safety and welfare of the public
- ... so as not to endanger anyone
- Be honest / realistic in making claims about the software
- ... so that public trust is maintained
- Maintain the security of the public's data
- etc.

(4 marks)

(b) The programmer writes a program to be used in a business. The source code of the program can be modified by the business. The business pays the programmer for the maintenance and security updates.

(i) Identify one suitable type of software licence for the program and describe the reasons for your choice.

(3)

(ii) Explain the reasons why the programmer should copyright their program.

(2)

Answer



Mark Scheme and Guidance

(i) Type of software licence

1 mark for

- Open Source Initiative // Free Software Foundation

Reason for choice:

1 mark for each bullet point (**max 2**)

- Allows program source code to be examined
- ... so that the business can adapt/modify the program to meet their needs
- Allows the programmer to earn money for the software and updates

(ii) **1 mark** for each bullet point (**max 2**)

- To identify themselves as the owner/author // To gain formal recognition of ownership
- To allow for legal consequences if anyone steals/copies it
- To restrict competition

(5 marks)

4 (a) A computer programmer writes programs that are distributed with a software licence.

Complete the table by writing the type of software licence each statement describes.

Statement	Software licence
A fee is charged for the software. The source code cannot be accessed. Users do not get a free trial.	
Users can try the software before buying it. Users may not be able to access all features during the trial.	
Software is usually free of charge. Users can access the source code and alter the program to their needs.	

Answer



Mark Scheme and Guidance

1 mark for each correct licence

Statement	Software licence
A fee is charged for the software. The source code cannot be accessed. Users do not get a free trial.	Commercial
Users can try the software before buying it. Users may not be able to access all features during the trial.	Shareware
Software is usually free of charge. Users can access the source code and alter the program to their needs.	Open Source // Free software

(3 marks)

- (b) Explain the reasons why it is important for the computer programmer to join a professional ethical body.

Answer



Mark Scheme and Guidance

1 mark for each bullet point (max 3)

e.g.

- The professional ethical body has ethical guidelines to follow
- ... so clients/other staff know the standards being applied
- ... so the computer programmer does not have to decide what is ethical — it's written down
- Clients/staff know the computer programmer is reputable
- ... there may be a test/requirement for entry
- ... giving recognition of the computer programmer's skills/knowledge
- The professional ethical body provides help and support
- ... for example, if the computer programmer needs legal advice
- The professional ethical body runs training courses
- ... to keep the computer programmer's skills up to date

(3 marks)

- 5 A bank allows customers to access their accounts using an application that they can download onto a device such as a smartphone.

The bank also needs to keep its customers' data private and secure.

Customers need to use biometric authentication to access their accounts. One biometric authentication method is facial recognition.

Facial recognition uses Artificial Intelligence (AI).

Describe how AI is used in facial recognition.

Answer



Mark Scheme and Guidance

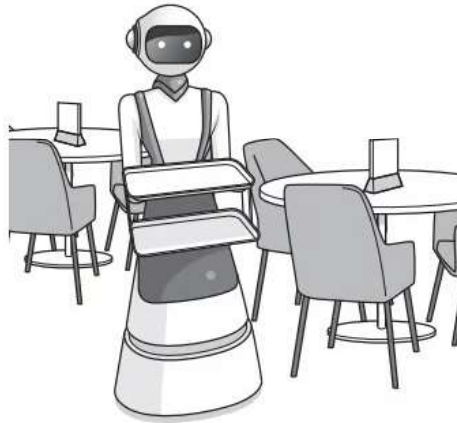
1 mark each to max 4:

e.g.

- Captures an image of the face
- Uses image recognition
- Trained to identify the features of a face in an image
- ... using a large number of images
- Analyse images for facial features
- Uses the probability of a match

(4 marks)

6 Robots are used to serve food and drink to customers at a restaurant.



The robot uses Artificial Intelligence (AI) to communicate with the customers. The customers speak to the robot to order their food and drinks.

Explain how AI will be used in this part of the robot.

Answer



Mark Scheme and Guidance

1 mark each to max 3:

e.g.

- Voice/speech recognition is used
- ... to identify if someone speaking
- The sound is recorded and analysed
- The audio recordings are compared to a database of words/sound waves
- ... to identify the word that has the highest probability of being said
- Natural language recognition is used
- Words are combined and compared to known sentences
- ... programmed action(s) for matching sentence(s) are performed

(3 marks)

7 (a) State **two** benefits to a programmer of distributing a program using a shareware licence.

Answer



Mark Scheme and Guidance

1 mark for each bullet point (max 2).

- Users are able to trial the program and may offer the programmer constructive **feedback**
- **More people** might try the program because the trial is free of charge
- Allows bugs to be found and corrected on a wide range of computer system configurations improving the programmer's original program
- Users that find the trial useful will buy the program so programmer gets **income**
- Allows the program to be **copyrighted** and so protects the programmer's intellectual property rights // no **illegal** modification allowed

(2 marks)

(b) Explain why it is important for a programmer to join a professional ethical body.

Answer



Mark Scheme and Guidance

1 mark for each bullet point (max 4).

- The programmer has ethical guidelines to follow
- ...so purchasers of programs know the standards being applied
- ...so programmer does not have to decide what is ethical or not
- Clients know programmer is reputable
- ...recognition of programmer's skills/knowledge
- There may be an entry requirement / exam
- ... so clients know that the programmer is competent
- Professional ethical body provides help and support
- Such as legal advice // by appropriate example
- Enables programmer to attend the ethical body's training courses
- ...to keep skills up to date // to develop skills

(4 marks)