MODULE K ALGORITHM DESIGN · K4

The program development life cycle

Original practice questions · 21 marks · ~25 minutes · Cambridge 0478 syllabus 7.1 (with 7.2(c))

Name _____ Date _____

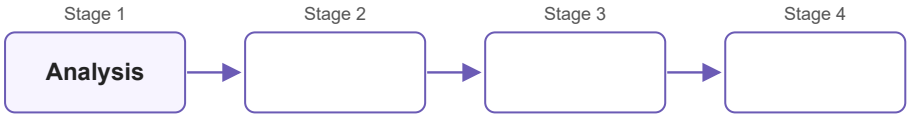
Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **21 marks**.

An indoor climbing centre asks a programmer to develop a program that books climbing sessions for groups of adult climbers. All the questions on this worksheet are about this program.

1

Total: 3 marks

(a) The program development life cycle has four stages. The first stage is shown. Complete the diagram by writing the name of each missing stage in the correct order. **[3]**



2

Total: 5 marks

(a) The table shows five tasks the programmer carries out. Tick (✓) **one** box in each row to show the stage of the program development life cycle in which each task is carried out. **[5]**

Task	Analysis	Design	Coding	Testing
Asking the centre manager what the program must do				
Writing the program code for the module that works out the cost of a booking				
Drawing a structure diagram of the booking program				
Running the finished program with a group size of 9 to check that it is rejected				
Deciding which details about the climbing centre the program does not need				

3 **Total: 4 marks**

During the analysis stage, the programmer collects these notes from the centre manager.

Centre manager's notes

- A group books a session lasting 1, 2 or 3 hours.
- A group can have from 1 to 8 climbers.
- Every climber must have completed a safety induction before they can be booked in.
- The program must output a booking reference and the total cost of the session.
- The climbing walls were repainted blue last year.
- The centre has a café that sells hot drinks.
- The centre first opened in 2015.

(a) Identify **two** requirements of the booking program from the notes. **[2]**

1

2

(b) The programmer uses abstraction. Identify **two** items of information in the notes that the programmer can leave out of the solution. **[2]**

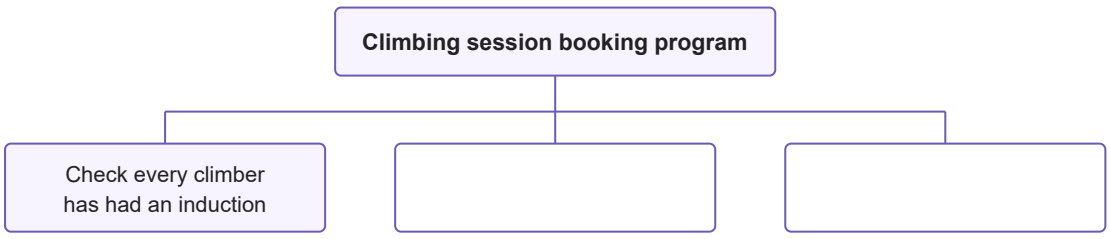
1

2

4 **Total: 4 marks**

In the design stage, the programmer decomposes the problem and starts a structure diagram.

(a) Complete the structure diagram by writing a different sub-problem of the booking program in each empty box. Use the manager's notes in Question 3. **[2]**



(b) Identify **two other** methods the programmer could use in the design stage to set out the steps of the booking algorithm. **[2]**

1

2

5 **Total: 2 marks**

In the coding stage, the programmer writes the program one module at a time, for example the module that works out the total cost of a session.

(a) Describe the iterative testing that the programmer carries out during the coding stage. **[2]**

6 **Total: 3 marks**

All the modules have been written and the program is complete. The programmer now moves on to the testing stage.

(a) Describe how the programmer tests the booking program in the testing stage. Refer to the booking program in your answer. **[3]**

Total for this worksheet: 21 marks