MODULE K ALGORITHM DESIGN · K1

Abstraction, decomposition, algorithmic thinking, and inputs, processes and outputs

Original practice questions · 20 marks · ~25 minutes · OCR J277 spec 2.1.1, 2.1.2

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 **20 marks**.

1

Total: 3 marks

Abstraction, decomposition and algorithmic thinking are principles of computational thinking.

(a) State what is meant by **abstraction**. **[1]**

(b) State what is meant by **decomposition**. **[1]**

(c) State what is meant by **algorithmic thinking**. **[1]**

2

Total: 4 marks

A city bike-hire company is designing a map for its phone app. Riders use the map to find the nearest docking station that has a bike they can hire, and to plan a route along the city's cycle lanes. Abstraction is used to decide what the map shows.

(a) Identify **two** details that the map needs to show. **[2]**

(b) Identify **two** details that can be left out of the map. **[2]**

3 **Total: 6 marks**

A delivery company has parcel lockers in town centres. A program controls each set of lockers. When a courier arrives, they scan the barcode on the parcel and enter the size of the parcel (small, medium or large). The program searches for an empty locker of that size and creates a random six-digit collection code for the parcel. The door of the chosen locker then opens and the screen shows the locker number so the courier can put the parcel inside. The collection code is sent to the customer in a text message.

(a) Complete the table to identify **two** inputs, **two** processes and **two** outputs for this program. **[6]**

	1	2
Inputs		
Processes		
Outputs		

4 **Total: 5 marks**

A community theatre wants a program that lets people book seats for its shows online. A team of four programmers will write the program. The team uses decomposition before they start.

(a) Identify **three** sub-problems that the booking program could be broken down into. **[3]**

(b) Explain **one** way that decomposition helps the team of programmers. **[2]**

5 **Total: 2 marks**

Algorithmic thinking is used to plan the steps a drinks vending machine follows to sell one drink. The steps are shown below in the **wrong** order.

Step	Description
A	Release the chosen drink
B	The customer selects a drink
C	Check that enough money has been paid
D	Display the price of the chosen drink
E	The customer inserts money to pay the price shown

(a) Write the letters **A** to **E** in the boxes to show the correct order of the steps. The first box is the first step. **[2]**

1st	2nd	3rd	4th	5th

Total for this worksheet: 20 marks