# Worksheet 1 Algorithms and flowcharts

**Task 1**

(a) Draw a flowchart for an algorithm which calculates how much money a student will need per week to buy a meal and two drinks each weekday. The user should be prompted to enter how much a meal costs, how much a drink costs, and then calculate and display the total required.

(b) Draw a flowchart for an algorithm which calculates how many numbers 1, 2, 3…n have to be added to reach a total greater than 500. Output the answer n.

**Task 2**

Jasmine plays a game on her computer screen. A moving balloon appears on the screen, and she has to pop the balloon by clicking on it with the mouse. When the balloon is popped another one appears. The aim of the game is to pop as many balloons as possible in one minute.

The flowchart for the game is shown below.

Start

No

Yes

No

Balloon touched?

Yes

Display new balloon

Display new balloon

No

Time = 0

**A**

balloonScore = \_\_\_

Time \_\_\_ 60?

**C**

**B**

**D**

(a) Complete the statement at **A**.

(b) Complete the statement in **B**.

(c) Complete the statement at **C**.

(d) Complete connector **D**.

(e) Add a flowchart box at the bottom of the flowchart to display the player’s score.

**Task 3**

Michael is writing a program for a dice game played with three dice.

(a) The player rolls the dice and is given points according to the following algorithm.

score = score - sum on third die

Start

End

No

Yes

score = die1 + die2 + die3

Yes

score = sum on two equal dice

score = 0

No

Are two of the dice equal?

die1, die2 and die3 equal?

 State the value of the scores if the dice rolled are:

 246

 551

 444

(b) Some rolls of the dice produce a negative score. State a set of three numbers that can be used to test whether the algorithm produces a negative score when it should, and state the expected output of your test data.

 **Task 4**

 James is writing a program to simulate a dice game. The function Random (1,6) generates a number beween 1 and 6. He has drawn a flowchart to represent the algorithm to calculate a player’s score when it is their turn. Paul and Coleen play the game.

 (a) Describe the rules of the game.

Start

End

No

Yes

Yes

No

Die1 = Random(1,6)

Die2 = Random(1,6)

Score = Score + Die1 + Die 2

Another go?

Score = 0

Output Score

Die1=Die2?

(b) Paul rolls the dice 3 times, getting six and two on the first throw, one and four on the second throw and two and three on the third throw. Coleen also rolls the the dice three times, getting five and six on the first throw, four and six on the second throw, two and two on the third throw.

 What are the scores of each player?