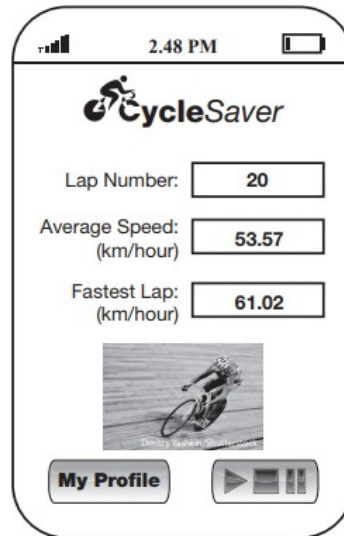# National 5 Programming Revision

1. CycleSaver is an application for palmtop computer systems that allows cyclists to record their track performance at the velodrome.

(a) State suitable data types for the variables:

Lap Number
Average Speed
Fasted Lap

(b) Part of the code used to calculate the Average Speed is shown below.

```
LINE 1  RECEIVE speed1 FROM KEYBOARD
LINE 2  RECEIVE speed2 FROM KEYBOARD
LINE 3  RECEIVE speed3 FROM KEYBOARD
LINE 4  RECEIVE speed4 FROM KEYBOARD
LINE 5  RECEIVE speed4 FROM KEYBOARD
LINE 6  RECEIVE speed5 FROM KEYBOARD
LINE 7  RECEIVE speed6 FROM KEYBOARD
….
….
….
LINE 21         total=
speed1+speed2+speed3+speed4+speed5+speed6………………….
LINE 22 average = total/20
```

(i)   Explain why this code is inefficient.
(ii)   State a more suitable data structure that could be used to store the speed of laps.
(iii) Rewrite the code above using the data structure to improve its efficiency.

2. Customers at Caffé Italia are given one credit on their Coffee Club Card when they buy two or more drinks. Customers with nine credits are entitled to a free coffee.

The tills in Caffé Italia are programmed to record sales data. Part of the design for one of the programs is shown below.

```
2.1  ask for the number of drinks
2.2  get the number of drinks
2.3  if drinks >= 2 then
2.4      add one to total credits
2.5  end if
```

(a) A complex condition is used to decide if a customer is to be given a free coffee. Customers must have at least nine credits. The offer is not available on Sundays.

Complete the following complex condition.

IF _____THEN display Free Coffee.

(b) The number of drinks entered should be between 1 and 10. Rewrite the design above to include this validation check.

(c) Customers are classified into reward categories depending on the number of credits achieved over a 6 month period. The code for this is shown below.

```
If credits >9 and credits <20 then
        Category = bronze
        Else if credits >=20 and credits <30 then
                Category = silver
                Else if credits >=30 and credits <40 then
                        Category = gold
                        Else
                                Category = platinum
                End if
        End if
End if
```

(i) Complete the test table below.

Type of Testing	Credits	Expected Category
	15	
Extreme		Silver
Extreme		Gold
	48	

(ii) Rewrite the code using a more efficient programming construct.