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| **National 5 Programming Revision** |
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| 1. | CycleSaver is an application for palmtop computer systems that allows cyclists to record their track performance at the velodrome. |
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|  | (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.  |
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| LINE 1 RECEIVE speed1 FROM KEYBOARDLINE 2 RECEIVE speed2 FROM KEYBOARDLINE 3 RECEIVE speed3 FROM KEYBOARDLINE 4 RECEIVE speed4 FROM KEYBOARDLINE 5 RECEIVE speed4 FROM KEYBOARDLINE 6 RECEIVE speed5 FROM KEYBOARDLINE 7 RECEIVE speed6 FROM KEYBOARD….….….LINE 21 total= speed1+speed2+speed3+speed4+speed5+speed6………………….LINE 22 average = total/20 |

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

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|  |  | (i) | Complete the test table below.

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

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