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