GCSE
COMPUTER SCIENCE

Component 3 Programming project task

Time allowed
- 20 hours

Instructions
- Evidence must include a complete listing of all program code together with a report. The report should describe the design of the solution, the testing and any potential enhancements and refinements to the solution.
- Students must use one of the following programming languages:
  - C#
  - Java
  - Pascal/Delphi
  - Python
  - VB.Net

Information
- The project is designed to be completed in 20 hours.
- The allocated time is not required to be continuous.
- There are restrictions on when and where students can work on this problem. Please see the Teachers' Notes which accompany this task for more information about these restrictions.
- Students may need to use the Internet to research certain parts of the problem. This must be within the 20 hours.
- Submission may be paper based or electronic using CD/DVD.
- Students will need to complete and sign a Candidate Record Form which declares that the work is their own. This must be countersigned by the teacher.
- Copyright permission is granted by AQA to use the copyright in the materials on the condition that such use is limited strictly to the personal use by each teacher and their students for the purpose of the preparation for and conduct of the programming project task only. The materials are not to be provided to anyone other than the teacher and the students undertaking the task. The teacher must collect this task back from the students at the end of each session. The use of the materials for the production and publication in any format of teaching materials or any other such material (other than for the teacher's personal use) is strictly forbidden.

Celebrity Dogs Game

A program needs to be created that allows the user to play Celebrity Dogs, a round-based category comparison card game.

There is a pack of cards with each card in the pack representing a famous dog. The following details about the dog appear on the card:

- The name of the dog.
- A value between 1 and 5 that indicates how much exercise the dog does, with 1 being the least amount of exercise and 5 the most amount of exercise.
- A value between 1 and 100 that indicates the intelligence of the dog, with 1 being the least intelligent and 100 being the most intelligent.
- A value between 1 and 10 that indicates the friendliness of the dog, with 1 being the least friendly and 10 being the most friendly.
  A value between 1 and 10 that indicates the amount of drool the dog produces, with 1 being the least amount of drool and 10 being the most amount of drool.

How does the game work?

The game is played against the computer. The game consists of a series of rounds. The player is asked to enter the number of cards in the pack. The pack of cards is dealt out with the player and the computer receiving half the cards in the pack each.

The player is shown their first card and they choose a category: *exercise*, *friendliness*, *intelligence* or *drool*.

The computer's first card is then revealed and the value for the chosen category compared to the value on the player's card.

If the category chosen was *exercise*, *friendliness* or *intelligence* then:

- if, for the chosen category, the player's card is equal to or higher than the computer's card then both cards are put at the bottom of the player's pile of cards
- if, for the chosen category, the player's card is lower than the computer's card then both cards are put at the bottom of the computer's pile of cards.

If the category chosen was *drool* then:

- if the player's card is equal to or lower than the computer's card then both cards are put at the bottom of the player's pile of cards
- if the player's card is higher than the computer's card then both cards are put at the bottom of the computer's pile of cards.

If the player won the comparison then they won that round and the next card from their pile is revealed and they choose a category for the round.

If the computer won the comparison then they won that round and the next card for both the player and the computer are revealed. The computer then randomly selects a category for the round.

The game continues until the player or the computer have no cards left in their pile. The winner of the game is the player who has all the cards in their pile.

The program should work in the following way:

1 A menu is displayed allowing the user to select from the following options:
- Play Game
- Quit.

2 If the user selects the 'Quit' option then a suitable message should be displayed and the program ends.

3 If the user selects the 'Play Game' option they are asked to enter the number of cards to be played. If the entered number is less than 4 or greater than 30, or is an odd number, then an appropriate error message is displayed, and the user returned to the menu.

4 The program should then read in the names of the dogs from the text file **dogs.txt**, creating a card for each dog.

5 The program should randomly generate a value for each category for each dog using the ranges described on page 2, adding them to each dog's card.

6 The number of cards entered in task 3 are then separated into two equal piles, the player's pile and the computer's pile. If you wish to extend your program further then the cards may be shuffled before they are separated into two piles, however you do not have to do this.

7 The first card in the player's pile is displayed and the user is asked to enter a category. The categories are *exercise*, *intelligence*, *friendliness* and *drool*.

8 The first card in the computer's pile is then displayed.

9 The value on the player's card for the chosen category is compared to the value in the same category on the computer's card.
- If the category chosen is *exercise*, *intelligence* or *friendliness* then the higher value wins the round.
- If the category chosen is *drool* then the lower value wins the round.
- If the values are the same then the player wins the round.

10 If the player wins the round then both cards are moved to the bottom of the player's pile. If the computer wins the round then both cards are moved to the bottom of the computer's pile. An appropriate message saying what the result of the comparison was and who won that round should be displayed.

11 If the player or the computer now has all the cards then they have won the game and a suitable message should be displayed. The program should return to the main menu.

12 Otherwise, the next round is played and the winner of the previous round chooses the category.
- If the player won the previous round then the card that is now on the top of the player's pile is displayed and they are asked to choose a category.
- If the computer won the previous round then a random category is chosen. The cards that are now on the top of the player's and computer's piles are displayed.
- The game continues until the player or the computer has won.

EXAMPLE

Figure 1 shows an example of a pack of six cards.

Figure 1

Dog name	Exercise	Intelligence	Friendliness	Drool
Annie the Afghan Hound	4	15	6	1
Bertie the Boxer	5	50	9	9
Betty the Borzoi	3	25	6	2
Charlie the Chihuahua	2	30	2	2
Chaz the Cocker Spaniel	2	80	9	4
Donald the Dalmatian	5	65	7	3

The cards in the deck are separated into two piles. The player's pile now contains three cards as shown in **Figure 2**. The computer's pile also contains three cards as shown in **Figure 3**.

Figure 2

Dog name	Exercise	Intelligence	Friendliness	Drool
Annie the Afghan Hound	4	15	6	1
Bertie the Boxer	5	50	9	9
Betty the Borzoi	3	25	6	2

Figure 3

Dog name	Exercise	Intelligence	Friendliness	Drool
Charlie the Chihuahua	2	30	2	2
Chaz the Cocker Spaniel	2	80	9	4
Donald the Dalmatian	5	65	7	3

The player goes first and chooses the category *drool*. The player wins as the *drool* value of their first card is less than the *drool* value of the first card in the computer's pile. **Figure 4** shows the comparison made.

Figure 4

Card Category	Player Card	Computer Card
Name	Annie the Afghan Hound	Charlie the Chihuahua
Exercise	4	2
Intelligence	15	30
Friendliness	6	2
Drool	1	2

As the player won the round the player's card and the computer's card are placed at the bottom of the player's pile. **Figure 5** shows the player's pile at the end of the round and **Figure 6** shows the computer's pile at the end of the round.

Figure 5

Dog name	Exercise	Intelligence	Friendliness	Drool
Bertie the Boxer	5	50	9	9
Betty the Borzoi	3	25	6	2
Charlie the Chihuahua	2	30	2	2
Annie the Afghan Hound	4	15	6	1

Figure 6

Dog name	Exercise	Intelligence	Friendliness	Drool
Chaz the Cocker Spaniel	2	80	9	4
Donald the Dalmatian	5	65	7	3

END OF PROGRAMMING PROJECT TASK