Exercise – Arrays

1. Is each of the following a valid or invalid array definition? (If a definition is invalid, explain why) Try to answer first before using Visual Studio - then check your answers using Visual Studio to see if you understand why something worked or didn't.

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int numbers[10] = { 0, 0, 1, 0, 0, 1, 0, 0, 1, 1 };
int matrix[5] = { 1, 2, 3, 4, 5, 6, 7 };
double radii[10] = (3.2, 4.7};
int table[7] = { 2, , , 27, , 45, 39 };
char codes[] = { 'A', 'X', '1', '2', 's' };
int blanks[];
int collection[-20];
int hours[3] = 8, 12, 16;
```

2. Given the following array definition:
   int values[] = {2, 6, 10, 14};
   What does each of the following display?
   a) cout << values[2]
   b) cout << ++values[0];
   c) cout << values[1]++;
   d) x = 2;
   cout << values[++x];
   e) cout << values[4];

3. Write a for loop to initialize the following array (int data[10]) with the values 10, 9, 8… (Etc)

4. Create a program that asks for 5 numbers from the user, and store them in an array. Print out the numbers in reverse order.

5. Write a program that lets the user enter 10 values into an array. The program should then display the largest and smallest values stored in the array.

6. Create a program that creates a small 3x3 array of integers. Use a nested for loop to initialise the numbers 1-9. Output the numbers in a grid format.

7. An application uses a two dimensional array defined as follows:
   int days[29][5];
   Write code that sums each row in the array and displays the results.
   Write code that sums each column in the array and displays the results.

8. Create a program that declares an array of 5 integer values. These values will represent the health of 5 characters. Initialise the values all to 100. Your program is to ask the user to enter a number (0 to 4) to select a character that is to be attacked by a monster. Each attack deals 40 damage per attack. If a player's health gets below 0 then should not be able to be attacked. Your program should simulate 5 attacks. After the attacks have finished, output the parties' remaining health to the console.
    CHALLENGE: Research random number generation and modify your program so that random damage is dealt with each attack.

9. Daenerys Targaryen wants to keep track of how many kilos of food her three dragons eat each day during a typical week. Write a program that stores this information in a 2 dimensional 3 x 7 array, where each row represents a different dragon and each column represents a different day of the week. The program should first have Dany input the user for each dragon. Then it should create a report that includes the following information:
    - Average amount of food eaten per day by all the dragons together
    - average amount of food eaten per day by any one dragon
    - the greatest amount of food eaten during one day and which dragon that was
    - the least amount of food eaten during one day and which dragon that was