

Assignment 3, Nov.22.2018**Due Date: Dec.20.2018**

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1 Write a code about guessing a number:

- Guess the number game:
- Task: Enter a 4-digit number, in a range of [1023 -9876] having each of the digits different from others to guess the random target number given by the computer
 - -2 means 2 numbers are guessed correctly, but they are not in the right place
 - +2 -2 means 4 numbers are guessed correctly; 2 of them at the right place, and 2 of them are not at the right place
 - +4 means 4 numbers are guessed correctly, they are at the right place.

Screen outputs will be as following

```

Welcome to "guess the number game"
Task: Enter a 4-digit number, in a range of [1023 -9876] having each of the digits
different from others to guess the random target number given by the computer

Enter a 4-digit number:
1234
-1
Enter a 4-digit number:
1236
-2
Enter a 4-digit number:
2643
+2
Enter a 4-digit number:
2678
+2 -1
Enter a 4-digit number:
2680
+4
Congratulations ! you've reach the target number in 5 attempts.

```

Pseudo-code is:

- Create a 4-digit number in a range of [1023 -9876], having each of the digits different from others (there should be a check for these properties, if the number is not acceptable, let the computer to decide on a suitable target number),
- Enter a four digit number to find the target number,
- Check the number, if the number is acceptable compare it with the target number, otherwise inform the user to enter a suitable number (comparison results should be in such forms: +2 -2 , +1, -3 +1, +4)
- Display the comparison result,
- After the comparison if it is +4, stop the game, otherwise enter a new number and execute steps II, III, IV),
- Display the number of attempts towards guessing the random target number.

Hints

- Use rand(), srand(), time() functions and related header files for the target number,
- This target number should be known only by the computer, not by the user,
- You have the split numbers into digits (e.g. targetNumber=1234 → targetNumberDigits[4]={ 1, 2, 3, 4 }
- You may use variables such as: targetNumber, guessNumber, guessAttempts, guessNumberDigits[4], targetNumberDigits[4], nDigitsAtRightPlace, nDigitsAtWrongPlace, targetNumberIsSuitable, guessNumberIsSuitable, etc.
- The codes may be in the form of:

```

Create a random target number
Check this number
while(! targetNumberIsSuitable)

```

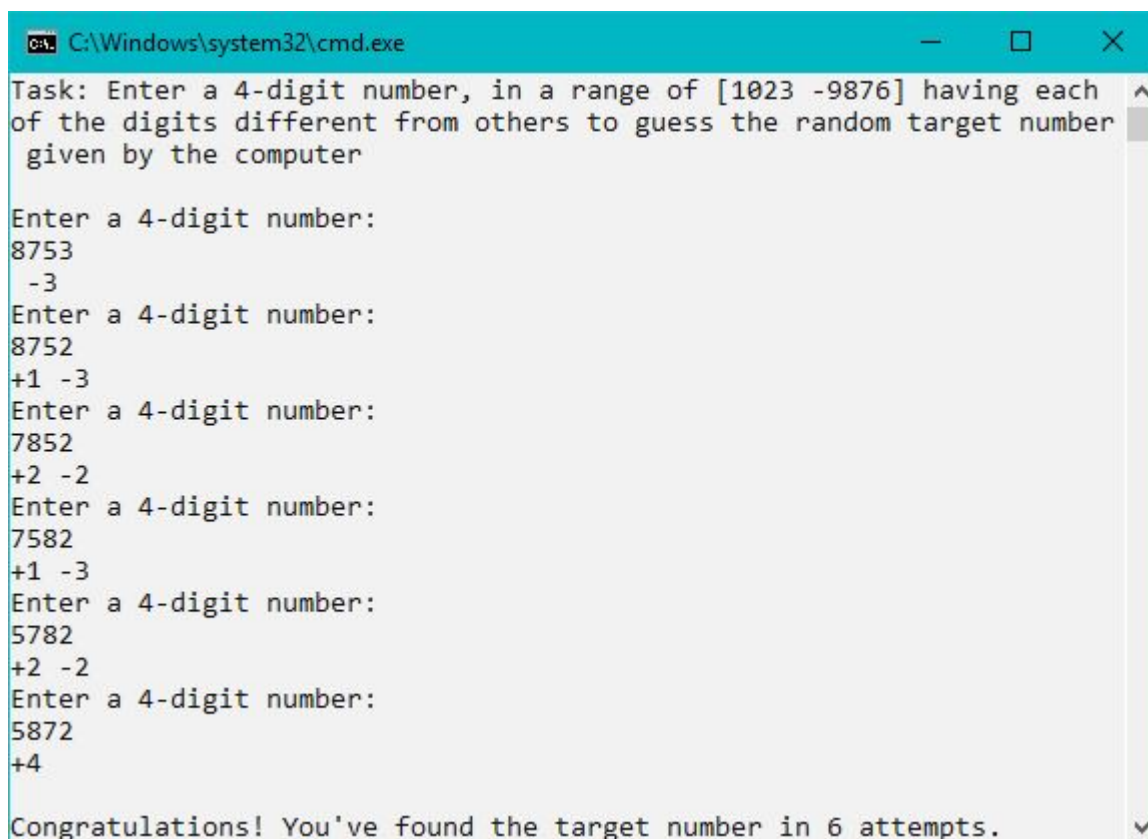
```
{
    Create a random target number
    Check this number
}

while(nDigitsAtRightPlace!= 4)
{
    Enter the guess number
    Check this number
    while (! guessNumberIsSuitable)
    {
        Enter the guess number
        Check this number
    }
    Compare two numbers
    Display the evaluation result
}
```

- 2 Compile your codes, run your application file, and save the screen image of the shell window.
- 3 Submit the prints out of your files : guessNumber.cpp, and an image of one of your runs

Dr Muharrem Mercimek

- a) Complete and submit your assignment yourself.
- b) The due date is firm and assignment can be submitted by the **end of this date**. “NO OTHER EXCEPTION”
- c) Print out your document and hand it in



```
C:\Windows\system32\cmd.exe

Task: Enter a 4-digit number, in a range of [1023 -9876] having each
of the digits different from others to guess the random target number
given by the computer

Enter a 4-digit number:
8753
-3
Enter a 4-digit number:
8752
+1 -3
Enter a 4-digit number:
7852
+2 -2
Enter a 4-digit number:
7582
+1 -3
Enter a 4-digit number:
5782
+2 -2
Enter a 4-digit number:
5872
+4

Congratulations! You've found the target number in 6 attempts.
```

```

1 #include <iostream>
2 #include <ctime>
3 using namespace std;
4 int *targetNumberDigits, *guessNumberDigits;
5 int guessNumber;
6 int guessAttempts = 0;
7 int *NumberToDigits(int);
8 bool IsSuitable(int*);
9 int PlaceCompare();
10 int RightPlaceCompare();
11 int WrongPlaceCompare();
12 void PrintTargetNumber();
13 int main()
14 {
15     srand(time(0));
16     do
17     {
18         targetNumberDigits = NumberToDigits(rand() % 8854 + 1023);
19     } while (!(IsSuitable(targetNumberDigits)));
20     cout << "Welcome to \"guess the number game\"\\nTask: Enter a 4-digit
        number, in a range of [1023 -9876] having each of the digits different
        from others to guess the random target number given by the computer\\n\\n";
21     //PrintTargetNumber();
22     do
23     {
24         cout << "Enter a 4-digit number:\\n";
25         cin >> guessNumber; //Assumed that an integer was typed, exceptions
            were not handled.
26         guessNumberDigits = NumberToDigits(guessNumber);
27     } while ((PlaceCompare() - 4));
28     cout << "\\nCongratulations! You've found the target number in " <<
        guessAttempts << " attempts.\\n";
29     return 0;
30 }
31 int *NumberToDigits(int Number)
32 {
33     int *NumberDigits = new int[4];
34     for (int i = 3; i >= 0; i--)
35     {
36         NumberDigits[i] = Number % 10;
37         Number = (Number - NumberDigits[i]) / 10;
38     }
39     if (Number)
40         return nullptr;
41     return NumberDigits;
42 }
43 bool IsSuitable(int *NumberDigits)
44 {
45     if (NumberDigits == nullptr)
46         return false;
47     for (int i = 0; i < 3; i++)
48         for (int j = i + 1; j < 4; j++)
49             if (NumberDigits[i] == NumberDigits[j])
50                 return false;
51     return true;
52 }

```

```
53 int PlaceCompare()
54 {
55     int nDigitsAtRightPlace = 0;
56     if (IsSuitable(guessNumberDigits) && *guessNumberDigits && guessNumber <= 9876)
57     {
58         nDigitsAtRightPlace = RightPlaceCompare();
59         int nDigitsAtWrongPlace = WrongPlaceCompare();
60         if (nDigitsAtRightPlace)
61             cout << '+' << nDigitsAtRightPlace;
62         if (nDigitsAtWrongPlace)
63             cout << ' ' << nDigitsAtWrongPlace;
64     }
65     else
66         cout << "The entered number is not suitable.";
67     cout << endl;
68     guessAttempts++;
69     return nDigitsAtRightPlace;
70 }
71 int RightPlaceCompare()
72 {
73     int nDigitsAtRightPlace = 0;
74     for (int i = 0; i < 4; i++)
75         if (targetNumberDigits[i] == guessNumberDigits[i])
76             nDigitsAtRightPlace++;
77     return nDigitsAtRightPlace;
78 }
79 int WrongPlaceCompare()
80 {
81     int nDigitsAtWrongPlace = 0;
82     for (int i = 0; i < 4; i++)
83     {
84         for (int j = 0; j < i; j++)
85             if (targetNumberDigits[i] == guessNumberDigits[j])
86                 nDigitsAtWrongPlace--;
87         for (int j = i + 1; j < 4; j++)
88             if (targetNumberDigits[i] == guessNumberDigits[j])
89                 nDigitsAtWrongPlace--;
90     }
91     return nDigitsAtWrongPlace;
92 }
93 void PrintTargetNumber()
94 {
95     cout << "Target number is: ";
96     for (int i = 0; i < 4; i++)
97         cout << targetNumberDigits[i];
98     cout << endl;
99 }
```