Week 4 assignments

When creating the program code, you must apply the following basic principles:

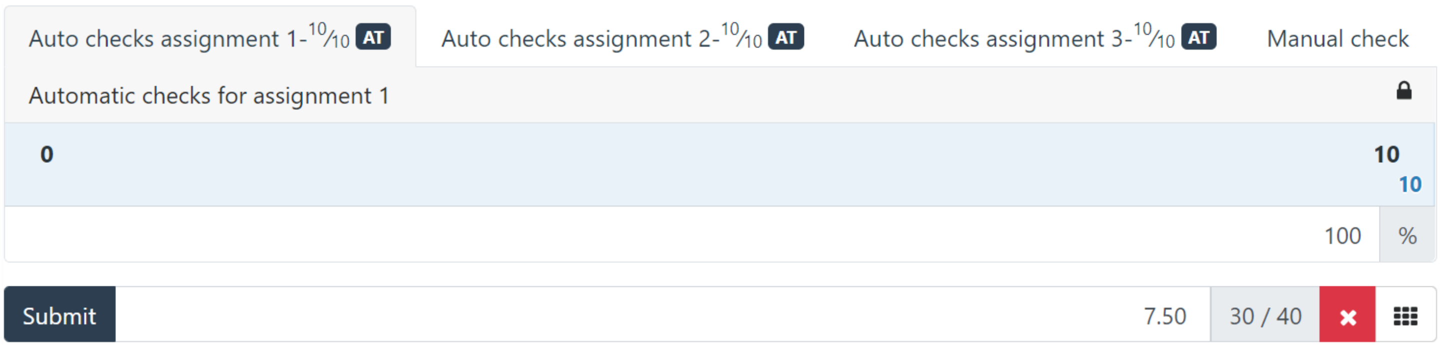
- create a separate project for each assignment;
- use name ‘assignment1’, ‘assignment2’, etcetera for the projects;
- create one solution for each week containing the projects for that week;
- make sure the output of your programs are the same as the given screenshots;

Note: for assignment 2 and 3, you need to use command line arguments to pass the filename to be used. Use the following code in your Main method:

```
static void Main(string[] args)
{
    if (args.Length != 1)
    {
        Console.WriteLine("invalid number of arguments!");
        Console.WriteLine("usage: assignment[2-3] <filename>");
        return;
    }

    string filename = args[0];

    Program myProgram = new Program();
    myProgram.Start(filename);
}

void Start(string filename)
{
    // your code here...
}
```

CodeGrade auto checks

Make sure all CodeGrade auto checks pass (10/10) for your assignments. The manual check will be done by the practical teacher.


Auto checks assignment 1- 10⁄10 AT | Auto checks assignment 2- 10⁄10 AT | Auto checks assignment 3- 10⁄10 AT | Manual check

Automatic checks for assignment 1

0 10
10

100 %

Submit 7.50 30 / 40

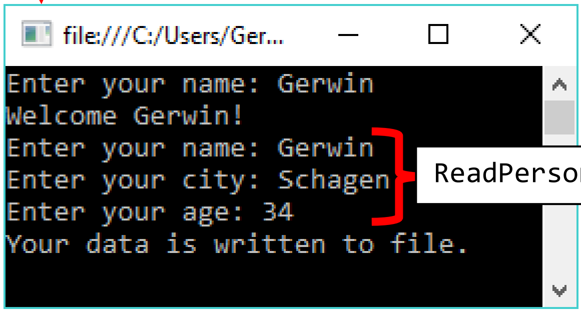
Assignment 1 – Data storage

a) Create a `class Person` (in a separate file) with the fields: name (`string`), city (`string`) and age (`int`).
Create a method:
```
    Person ReadPerson()
```
This method asks for the data of a person, reads this data and returns a Person-object.
Also create a method:
```
    void DisplayPerson(Person p)
```
This method displays the data of a person on screen.
→ Test both methods by calling them from the Start method.

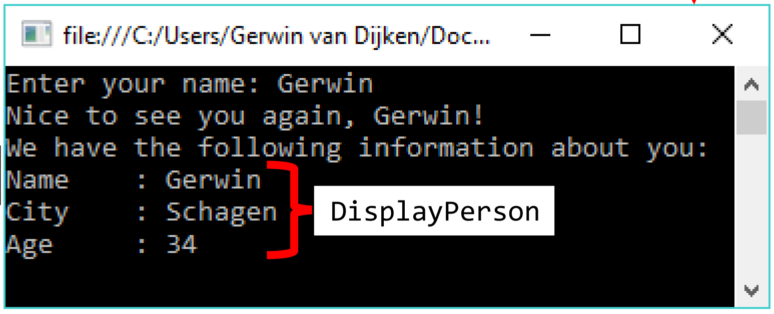
b) We want to write the data of a person into a file so next time we don't have to enter this data again.
For this, create a method:
```
    void WritePerson(Person p, string filename)
```
This method writes the (data of a) person to file, each field on a separate line.
→ Test the method in the Start method.
→ Check if the file is created and if it contains the data (of a person).

c) Create a method:
```
    Person ReadPerson(string filename)
```
This method reads a person from a file with the given filename, and returns this person.
→ Test the method by calling it from the Start method.

d) Now use the implemented methods in order to create the Start method with the following functionality:
- The user is being asked to enter his/her name.
- [new user]: When there is no file with the name of the user ('<name>.txt'), then the message 'Welcome <name>!' is shown and the user must enter the information (name, city and age) and this information is written to file (with filename '<name>.txt').
- [existing user]: When a file exists with the name of the user (e.g. "Brian.txt"), then the message 'Nice to see you again, <name>!' is shown, and also the information stored in the file is displayed.



```
Enter your name: Gerwin
Welcome Gerwin!
Enter your name: Gerwin
Enter your city: Schagen
Enter your age: 34
Your data is written to file.
```



```
Enter your name: Gerwin
Nice to see you again, Gerwin!
We have the following information about you:
Name     : Gerwin
City     : Schagen
Age      : 34
```

Assignment 2 – Hangman

The last version of Hangman was using a hardcoded list of words. Ofcourse it's more fun to pick a word from a long list of words (read from a textfile). You can't read a random word from file, so you first need to read all words from file and then pick one randomly (that one will be used as the secret word in the Hangman game).

a) Modify your Hangman program in order to read the words from a textfile. Use the file 'words.txt' from Moodle, <u>using a command line parameter</u>. Make sure the program still works.
Note: The file on Moodle also contains very short words. So, check if the randomly picked word contains at least 3 letters. If not, choose another word.

Assignment 3 – Word finder

In this assignment the user can enter a word, and the program will try to find this word in a textfile. All lines containing the word will be displayed on screen. A file containing tweets of president Donald Trump can be found on Moodle (but you can also use another text file). Use a command line parameter for the file to use.

a) Create a method with signature:

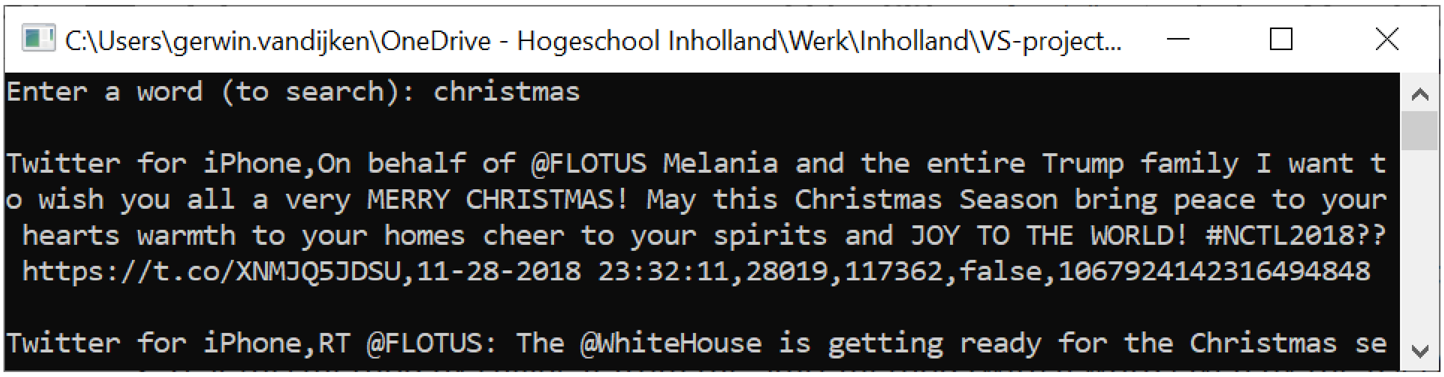
```
bool WordInLine(string line, string word)
```

This method returns true if the (given) word is present in the (given) line. The check has to be 'case insensitive'.

b) Create a method:

```
int SearchWordInFile(string filename, string word)
```

This method reads and processes each line in a file.
When a line contains the given word (use method `WordInLine`), then this line is printed on screen.
The method `SearchWordInFile` returns the number of lines containing the word.
→ Test this method by calling it from the Start method (with a word given by the user). The Start method displays the returned number on screen.



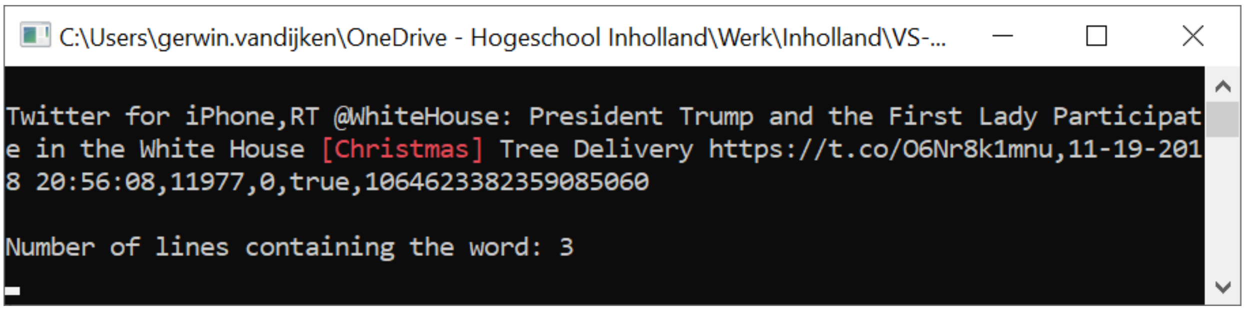
C:\Users\gerwin.vandijken\OneDrive - Hogeschool Inholland\Werk\Inholland\VS-project...

```
Enter a word (to search): christmas

Twitter for iPhone,On behalf of @FLOTUS Melania and the entire Trump family I want t
o wish you all a very MERRY CHRISTMAS! May this Christmas Season bring peace to your
 hearts warmth to your homes cheer to your spirits and JOY TO THE WORLD! #NCTL2018??
 https://t.co/XNMJQ5JDSU,11-28-2018 23:32:11,28019,117362,false,1067924142316494848

Twitter for iPhone,RT @FLOTUS: The @WhiteHouse is getting ready for the Christmas se
```

c) To indicate where the word is located in a line, we will print the word in a different color.
Create a method:

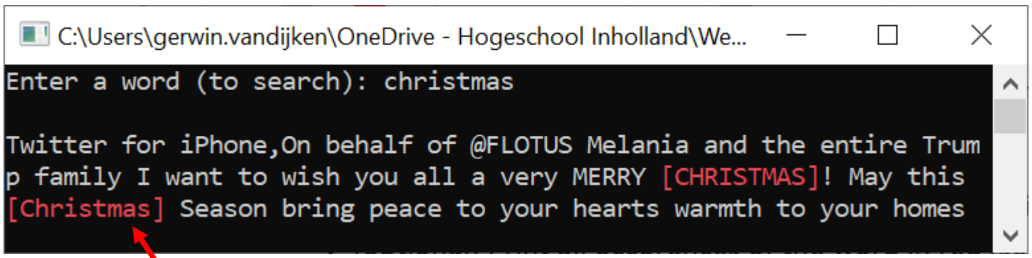
```
void DisplayWordInLine(string line, string word)
```

This method displays the given line to screen, with the word displayed in red (see screenshot below).
Use `line.IndexOf(word)` to get the starting position of the word in the line.
Use `line.Substring(start)` or `line.Substring(start, length)` to get a substring of the line.[1]
You only need to print the first occurence of the word in red.
→ Modify method `SearchWordInFile` in order to print the lines via method `DisplayWordInLine`.
→ [optional] Print all occurences of the word in red (see last screenshot).



C:\Users\gerwin.vandijken\OneDrive - Hogeschool Inholland\Werk\Inholland\VS-...

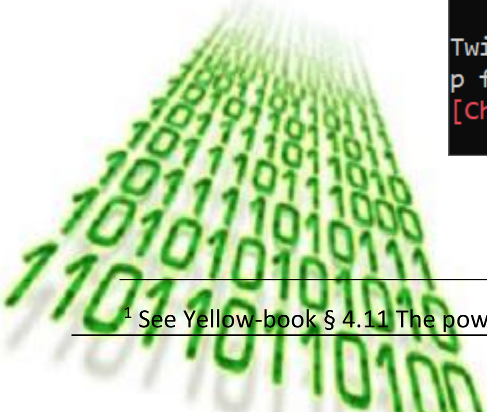
```
Twitter for iPhone,RT @WhiteHouse: President Trump and the First Lady Participat
e in the White House [Christmas] Tree Delivery https://t.co/O6Nr8k1mnu,11-19-201
8 20:56:08,11977,0,true,1064623382359085060

Number of lines containing the word: 3
```



C:\Users\gerwin.vandijken\OneDrive - Hogeschool Inholland\We...

```
Enter a word (to search): christmas

Twitter for iPhone,On behalf of @FLOTUS Melania and the entire Trum
p family I want to wish you all a very MERRY [CHRISTMAS]! May this
[Christmas] Season bring peace to your hearts warmth to your homes
```

Print the word between square brackets!!



[1] See Yellow-book § 4.11 The power of strings and chars.

Assignment 4 – Candy Crush *(not mandatory)*

We will modify the CandyCrush assignment of the 2nd week, so we will be able to save the playing field to a textfile, and to start the game with the playing field stored in a textfile (by reading it back).

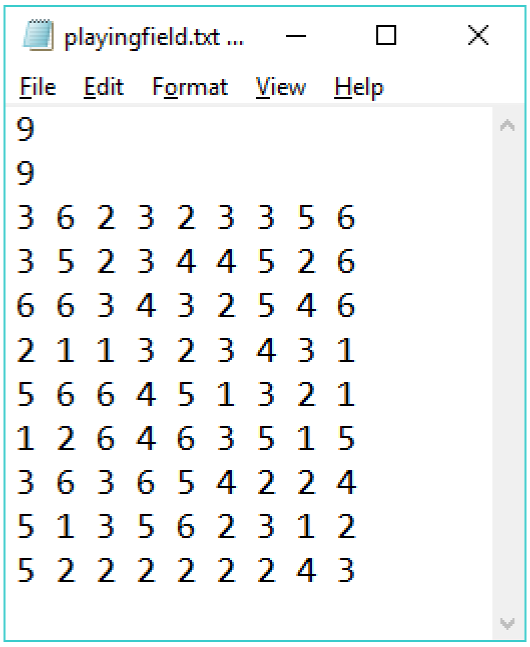
a) Create a method:
`void WritePlayingField(RegularCandies[,] playingField, string filename)`
This method saves the playing field to a textfile. Use the `int`-values of the enumeration RegularCandies. Save the values row by row, so the playing field can be recognized in the textfile. An example of such a file is shown in the figure below.

b) Create a method:
`RegularCandies[,] ReadPlayingField(string filename)`
This method reads a playing field from a file (with the given filename) and returns this playing field.
Hint: To read multiple numbers from one line, read the whole line as a string. Then split this line into an array with string-items (with `Split`). The strings in the array can be parsed (one by one) to an `int`-value.
→ `string[] numberStrings = line.Split(' ');`

c) Now modify the Start method in order to read the playing field from a file (if the file exists) or to fill it with random candies (if the file does not exist). When a new playing field is created, then write it to a file.

d) Make sure the program does not crash if the file is not correct (maybe because there are not enough lines in the file, or a line does not contain enough numbers). In the Start-method catch the exception, and generate a new playing field with random candies (and save this to file).

e) You are now able to change manually the playing field in the file (with e.g. Notepad), in order to test the methods `ScoreRowPresent` and `ScoreColumnPresent` with specific values. There are certain 'boundary values' that will (most likely) not be present in a random generated playing field. What would be good 'boundary tests' for methods `ScoreRowPresent` and `ScoreColumnPresent`?
→ Execute (and check) these boundary tests.



```
9
9
3 6 2 3 2 3 3 5 6
3 5 2 3 4 4 5 2 6
6 6 3 4 3 2 5 4 6
2 1 1 3 2 3 4 3 1
5 6 6 4 5 1 3 2 1
1 2 6 4 6 3 5 1 5
3 6 3 6 5 4 2 2 4
5 1 3 5 6 2 3 1 2
5 2 2 2 2 2 2 4 3
```

Possible format for a CandyCrush textfile (the 1st row contains the number of rows, the 2nd row contains the number of columns, and then <number of rows> rows with <number of columns> columns)