

CS101 Homework 4 : String Puzzle

Deadline 4 May 2016, 23:55

In this assignment you will write a Java console program, which builds up a string puzzle and solves it. This program will first ask the user to enter an array of array of char (i.e., two dimensional char array) . This two dimensional **square** array represent our string puzzle. Afterwards, it will ask a keyword to search in this puzzle horizontally (from right to left and also from left to right) and vertically (from up to bottom, from bottom to up).

The following figure shows a sample string puzzle, 6 by 6.

```
e d d i e a
b r u c e a
s t e v e a
a n d y a a
n i c k o a
j a n i c k
```

You can find the step by step explanation of the assignment below:

Step -1 Gathering the string puzzle from the user:

In order to gather a string puzzle from the user, the program will first ask “n”, which denotes the length of the array. For instance, n is equal to 6 in the given example puzzle above. This number determines the number of rows and columns in this puzzle.

First, your program will ask the user to enter “n”:

“please enter the size of the nxn array : ”

You will create a *nxn* two dimensional array of char.

Next, your program will ask the user to enter n number of strings and preprocess these strings to build up *nxn* two dimensional array of char.

For example if the first string entered by the user is “gather”, the first item of the array will be initialized as follows:

```
puzzle[0][0]= 'g'
puzzle[0][1]= 'a'
puzzle[0][2]= 't'
puzzle[0][3]= 'h'
```

```
puzzle[0][4]= 'e'  
puzzle[0][5]= 'r'
```

Modifications :

Recall that we create a nxn array of char by preprocessing the input strings entered by the user. If the length of the given **string is different** than n, you may need to trim or add default letter(s) to fill the created array completely. You should take 'a' as the default letter.

Please study the following example illustration to make it clear how you will process the input strings, whose length is different than n.

Assume that n=4 and we have a puzzle by 4x4.

Case 1 where input string length < n:

To ensure that the length of the string is equal to n, we will add a default letter at the end of the string. **The default letter is 'a'.**

For example, for an input string "and", which has a length of **3**, **you should add the letter of 'a' at the end of the string until the string length becomes n** where we assumed that n is 4. Hence, you will add only one 'a' at the end of the string.

- ❑ "and" -> "anda"
- ❑ "fr" -> "fraa"

Case 2 where input string length > n:

To ensure that the length of the string is equal to n, you need to remove/delete the characters, exceeding the length of n.

For an input string "eddie" which has a length of 5, we should trim its length down to 4 where the input string becomes "eddi" - recall that in our example n is equal to 4. Another example is "**P**neumonoultramicroscopicsilicovolcanoconiosis"

- ❑ "eddie" -> "eddi"
- ❑ "**P**neumonoultramicroscopicsilicovolcanoconiosis" -> "**pneu**".

* For any given string you have to transform it to **lowercase letters while initializing your puzzle array.**

*After you have done the required modifications you should create two dimensional char array from the input strings.

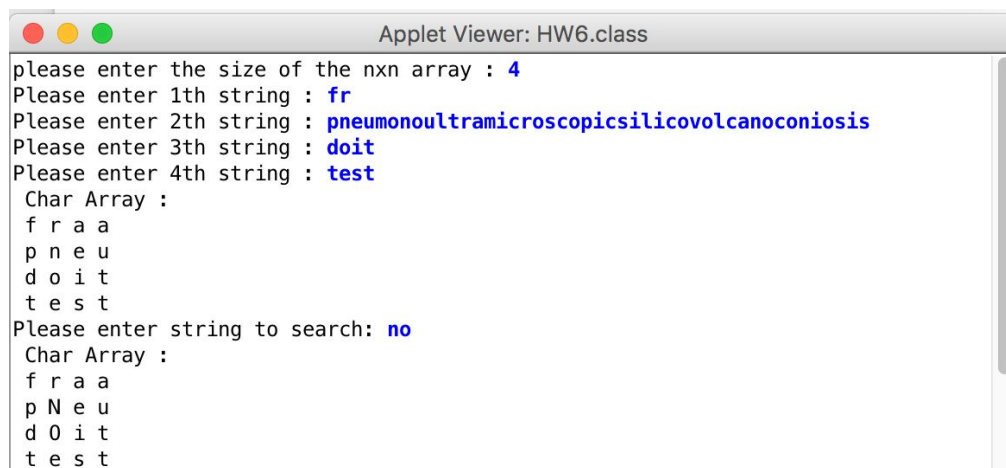
HINT : you can use toCharArray() or use StringTokenizer.

Step -2 Searching a keyword in the string puzzle:

Next step is to ask the user to enter a keyword to be searched in the given string puzzle. Your program will search the keyword horizontally and vertically. If the keyword is "tin", your program should find every "tin" in both directions (i.e. you have to find every "tin" and "nit" both horizontally and vertically).

Important issues :

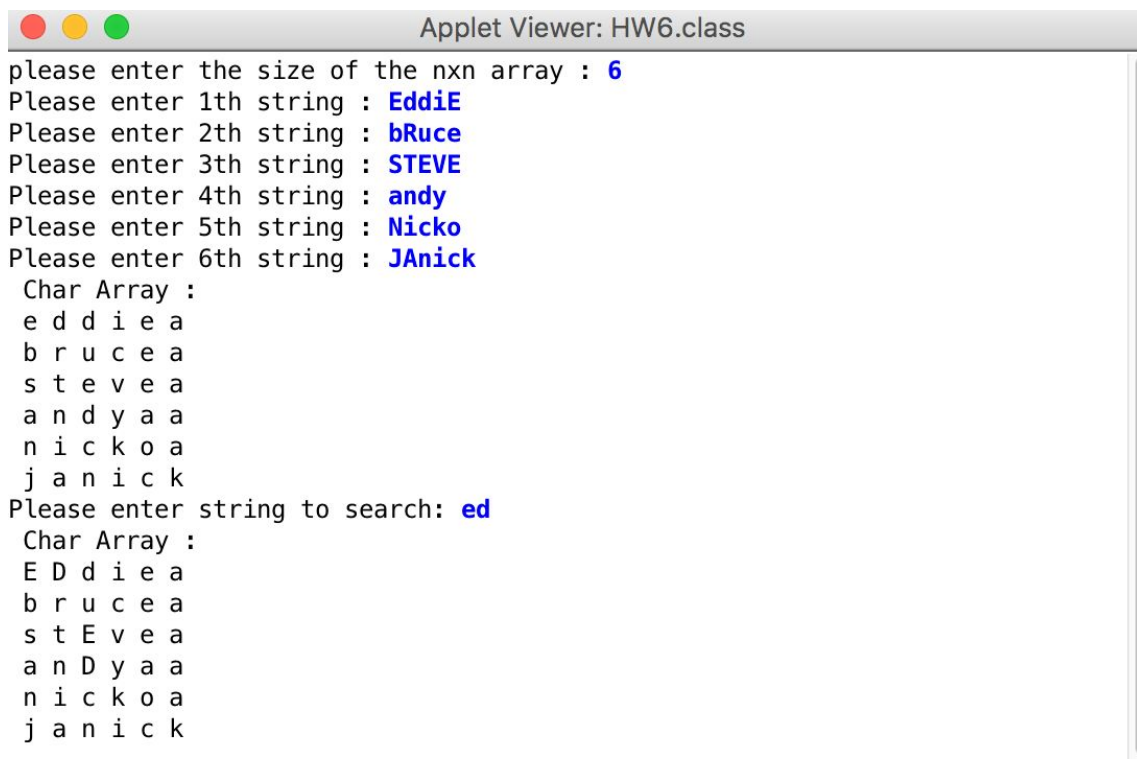
- You have to search both in columns and rows.
 - You have to find both “tin” and “nit” in the array.
 - You have to find overlapping cases such as : “tinit” where there is both “tin” and “nit”
- After you have found the given string in the char array according to the instructions, **you have to convert them to uppercase letters !** You can see how the output is given to the user in the following figure.



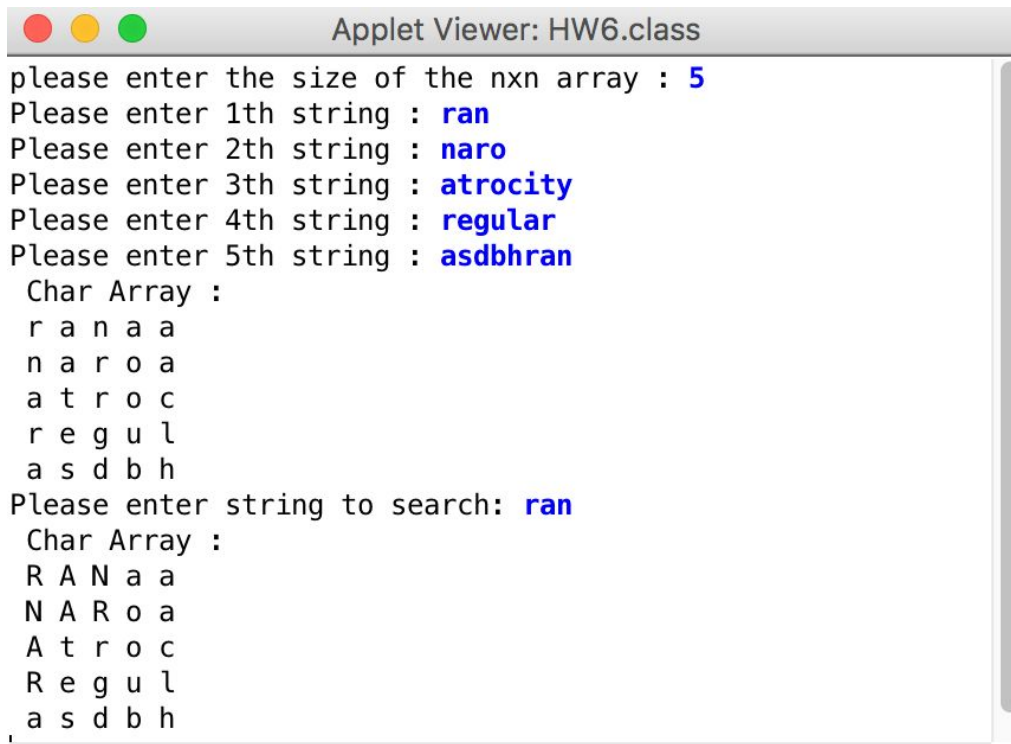
```
Applet Viewer: HW6.class
please enter the size of the nxn array : 4
Please enter 1th string : fr
Please enter 2th string : pneumonoultramicroscopicsilicovolcanoconiosis
Please enter 3th string : doit
Please enter 4th string : test
Char Array :
f r a a
p n e u
d o i t
t e s t
Please enter string to search: no
Char Array :
f r a a
p N e u
d O i t
t e s t
```

- Your program should **print out the input array and the output array** for comparison.
- Your program **should handle any number for n.**

Example outputs of program should be as the examples given below :



```
Applet Viewer: HW6.class
please enter the size of the nxn array : 6
Please enter 1th string : EddiE
Please enter 2th string : bRuce
Please enter 3th string : STEVE
Please enter 4th string : andy
Please enter 5th string : Nicko
Please enter 6th string : JAnick
Char Array :
e d d i e a
b r u c e a
s t e v e a
a n d y a a
n i c k o a
j a n i c k
Please enter string to search: ed
Char Array :
E D d i e a
b r u c e a
s t E v e a
a n D y a a
n i c k o a
j a n i c k
```



```
Applet Viewer: HW6.class
please enter the size of the nxn array : 5
Please enter 1th string : ran
Please enter 2th string : naro
Please enter 3th string : atroc
Please enter 4th string : regular
Please enter 5th string : asdbhran
Char Array :
r a n a a
n a r o a
a t r o c
r e g u l
a s d b h
Please enter string to search: ran
Char Array :
R A N a a
N A R o a
A t r o c
R e g u l
a s d b h
```

Coding Instructions :

- Submit a file named **StringPuzzle.java** to the LMS **submissions with different names will be disregarded!**
- **Everything should be implemented in methods e.g one method for menu print another method for count words etc..**
- Make sure your program **compiles and runs before submitting otherwise you will get 0 from your homework (no exceptions).**
- **Do not use any structure that is not mentioned in class. If you would like to use such structure consult to your instructor.**
- The first lines of your code must include your name, surname, student number, and department as a comment. An example comment is as follows:

```
/* John Smith S0001 Department of Computer Science */
```

- Submit .java files only. Do NOT submit .rar, .zip, .doc, .class, etc. files.
- **IMPORTANT : Add comments to your code that briefly explains what your code does such as :**

```
int x; // x holds the number of square
```