

CMPSC 221

OO Programming with Web-Based Applications

Spring 2021

Due Date: Friday, February 5th, 2021 (11:59 p.m. ET)

Name: _____

Instructions: Please create a Java application to solve the following problem. Submit electronic (Canvas Dropbox) copies of your program source code and **two or more** sample runs to me by the deadline. For the electronic submission of your program, you may: 1) compress (i.e., zip) your entire project folder (NetBeans, Eclipse, etc.) and upload that to Canvas OR 2) place your Java source code file(s) in a folder, compress the folder, and upload that to Canvas. Documentation requirements follow the problem specification. **Important Note:** Please be sure to upload your Project 1 files to Canvas by the deadline. If you miss the deadline, you WILL automatically receive a grade of 0 (zero).

1. Create a Java application that implements a simple word search game. The theme of this particular game is “C++ key words.” The program begins by prompting the player to enter a string representing a word search puzzle. The string consists of uppercase letters, spaces, and “\$” signs. Adjacent letters are separated by a single space (for readability). Each “\$” sign marks the end of one row in the puzzle and the beginning of the next. For example, the string "X A R O F N S Q\$X B G K V U O D\$Z W H I L E C T" represents the puzzle:

```
X A R O F N S Q
X B G K V U O D
Z W H I L E C T
```

After the player enters the puzzle string, the program displays the puzzle as shown above. In a typical word search game, letters representing search words may be arranged horizontally, vertically, or diagonally and ordered forwards or backwards. Since this is a simplified implementation, letters representing search words are only arranged horizontally and ordered forwards or backwards. (Can you find the three C++ key words in the above puzzle?) Next, the program prompts the player to enter a word to search for, and displays an appropriate message (see sample runs) depending on whether the search word was found/not found. If the word was found, the puzzle is displayed with the letters of the found word masked with asterisks (“*” ’s). (Note: If the word was not found, the puzzle does not have to be displayed again.) At this point, the player may choose to continue searching for key words in the current puzzle, enter a new puzzle to search, or quit the word search game. If the player decides to quit, the program thanks the player for playing and ends. Your program output should resemble the sample runs at the end of this document.

Implementation Requirements:

- This project is primarily an exercise in learning to use the Java `String` class and accompanying methods. Consequently, you **may not** use data structures such as arrays or `ArrayLists`. You may use related classes such as `StringBuffer` or `StringBuilder`, however.
- The string representing the word search puzzle **must** be implemented as specified above.
- Search words and Y/N (i.e., yes/no) responses **must** be case-insensitive.
- For this first programming project, a single Java class is sufficient, and the use of methods (in addition to `main`) is optional.

References:

- Savitch, 6th Edition: Chapters 1 – 3 (basics)
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Documentation Requirements:

- 1) Each program source code file (i.e., Java class) must have a header at the beginning of the class containing the following:
 - Name of author, PSU e-mail address of author, name of course, assignment number and due date, name of file, purpose of class, compiler/IDE, operating system, and any external references used (e.g., Website)
 - Example:

```
/*
Author:      Wanda Kunkle
E-mail:      wmk12@psu.edu
Course:      CMPSC 221
Assignment:   Programming Assignment 1
Due date:    2/5/2021
File:        WordSearchGame.java
Purpose:     Java application that implements a simple word search game
Compiler/IDE: Java SE Development Kit 14.0.2/IntelliJ IDEA 2020.3.1
Operating
system:      MS Windows 10 Home
Reference(s): Java 14 API - Oracle Documentation
              (https://docs.oracle.com/en/java/javase/14/docs/api/);
              (Include ALL additional references (Web page, etc.) here.)
*/
```

- 2) The purpose of each method in the source code file(s) must be documented as shown in the example below. I prefer that you use the **javadoc** comment style.

```
/** This method checks the puzzle for the user's search word.
 *
 * @param word      The user's word for which to check.
 * @return          True if the word was found, false otherwise.
 */
public boolean checkWord(String word)
{
    // Method definition (i.e., body)
}
```

Sample run #1 (generated using Apache NetBeans IDE 11.3):

```
-----  
Building KeyWordSearch11 1.0-SNAPSHOT  
-----
```

```
--- exec-maven-plugin:1.5.0:exec (default-cli) @ KeyWordSearch11 ---
```

```
Please enter a string representing a word search puzzle:
```

```
X A R O F N S Q$X B G K V U O D$Z W H I L E C T
```

```
Puzzle:
```

```
X A R O F N S Q
```

```
X B G K V U O D
```

```
Z W H I L E C T
```

```
*****
```

```
Please enter a word to search for: for
```

```
Search word "FOR" found reversed!
```

```
Puzzle:
```

```
X A * * * N S Q
```

```
X B G K V U O D
```

```
Z W H I L E C T
```

```
Search for another word (Y/N)? y
```

```
*****
```

```
Please enter a word to search for: if
```

```
Search word "IF" not found. :-(
```

```
Search for another word (Y/N)? Y
```

```
*****
```

```
Please enter a word to search for: wHiLe
```

```
Search word "WHILE" found!
```

```
Puzzle:
```

```
X A * * * N S Q
```

```
X B G K V U O D
```

```
Z * * * * C T
```

```
Search for another word (Y/N)? y
```

```
*****
```

Please enter a word to search for: dO
Search word "DO" found reversed!

Puzzle:

X A * * * N S Q
X B G K V U * *
Z * * * * * C T

Search for another word (Y/N)? n

Play again (Y/N)? N

Thanks for playing!

BUILD SUCCESS

Total time: 01:19 min
Finished at: 2021-01-24T23:27:47-05:00
Final Memory: 10M/307M

Sample run #2 (generated using Apache NetBeans IDE 11.3):

```
-----  
Building KeyWordSearch11 1.0-SNAPSHOT  
-----
```

```
--- exec-maven-plugin:1.5.0:exec (default-cli) @ KeyWordSearch11 ---
```

Please enter a string representing a word search puzzle:

```
X O Q J Y T M X H T J U C E H I K V C K N U L L P T R T A R P V A B X M H Q O D $ H P W P  
D H C T I W S L Y L H D K V U K S X S G H E L N X H L S X W C N W P A Y $ N R U T E R Y Q  
N L A N V I M C K W I W E P P F A M U A G C I T A T S G I E B M $ G O N D L V P Q E S A C  
V H K J H E U X R D W D N E W Z X P U Z B F Y Q R S R M $ E L S E U K Z X P S J A K C Q N  
A J G H E C A P S E M A N E T E L E D B A Q U Y
```

Puzzle:

```
X O Q J Y T M X H T J U C E H I K V C K N U L L P T R T A R P V A B X M H Q O D  
H P W P D H C T I W S L Y L H D K V U K S X S G H E L N X H L S X W C N W P A Y  
N R U T E R Y Q N L A N V I M C K W I W E P P F A M U A G C I T A T S G I E B M  
G O N D L V P Q E S A C V H K J H E U X R D W D N E W Z X P U Z B F Y Q R S R M  
E L S E U K Z X P S J A K C Q N A J G H E C A P S E M A N E T E L E D B A Q U Y
```

```
*****
```

Please enter a word to search for: ElSE

Search word "ELSE" found!

Puzzle:

```
X O Q J Y T M X H T J U C E H I K V C K N U L L P T R T A R P V A B X M H Q O D  
H P W P D H C T I W S L Y L H D K V U K S X S G H E L N X H L S X W C N W P A Y  
N R U T E R Y Q N L A N V I M C K W I W E P P F A M U A G C I T A T S G I E B M  
G O N D L V P Q E S A C V H K J H E U X R D W D N E W Z X P U Z B F Y Q R S R M  
* * * * U K Z X P S J A K C Q N A J G H E C A P S E M A N E T E L E D B A Q U Y
```

Search for another word (Y/N)? y

```
*****
```

Please enter a word to search for: double

Search word "DOUBLE" not found. :-(

Search for another word (Y/N)? Y

```
*****
```

Please enter a word to search for: StaTic

Search word "STATIC" found reversed!

Puzzle:

```
X O Q J Y T M X H T J U C E H I K V C K N U L L P T R T A R P V A B X M H Q O D  
H P W P D H C T I W S L Y L H D K V U K S X S G H E L N X H L S X W C N W P A Y  
N R U T E R Y Q N L A N V I M C K W I W E P P F A M U A G * * * * * G I E B M  
G O N D L V P Q E S A C V H K J H E U X R D W D N E W Z X P U Z B F Y Q R S R M  
* * * * U K Z X P S J A K C Q N A J G H E C A P S E M A N E T E L E D B A Q U Y
```

Search for another word (Y/N)? y

Please enter a word to search for: return
Search word "RETURN" found reversed!

Puzzle:

X O Q J Y T M X H T J U C E H I K V C K N U L L P T R T A R P V A B X M H Q O D
H P W P D H C T I W S L Y L H D K V U K S X S G H E L N X H L S X W C N W P A Y
* * * * * Y Q N L A N V I M C K W I W E P P F A M U A G * * * * * G I E B M
G O N D L V P Q E S A C V H K J H E U X R D W D N E W Z X P U Z B F Y Q R S R M
* * * * * U K Z X P S J A K C Q N A J G H E C A P S E M A N E T E L E D B A Q U Y

Search for another word (Y/N)? n

Play again (Y/N)? y

Please enter a string representing a word search puzzle:

Q N W J F T J O R V O I D G E S S A L C \$ U U Y K D E N G I S N U X V C R H L B H \$ E S B J
P W T D C U E E T A V I R P L H \$ E V N L H I N L A D F F I N T C X J A K \$ S T R I I B R E
A K P N V C H K J B S W \$ A Y L J L C V S D P R O T E C T E D S Z \$ V L O O B M V Y L T A K
Y P S F F Y L Y

Puzzle:

Q N W J F T J O R V O I D G E S S A L C
U U Y K D E N G I S N U X V C R H L B H
E S B J P W T D C U E E T A V I R P L H
E V N L H I N L A D F F I N T C X J A K
S T R I I B R E A K P N V C H K J B S W
A Y L J L C V S D P R O T E C T E D S Z
V L O O B M V Y L T A K Y P S F F Y L Y

Please enter a word to search for: class
Search word "CLASS" found reversed!

Puzzle:

Q N W J F T J O R V O I D G E * * * * *
U U Y K D E N G I S N U X V C R H L B H
E S B J P W T D C U E E T A V I R P L H
E V N L H I N L A D F F I N T C X J A K
S T R I I B R E A K P N V C H K J B S W
A Y L J L C V S D P R O T E C T E D S Z
V L O O B M V Y L T A K Y P S F F Y L Y

Search for another word (Y/N)? y

Please enter a word to search for: FloaT
Search word "FLOAT" not found. :-(

Search for another word (Y/N)? y

Please enter a word to search for: breaK
Search word "BREAK" found!

Puzzle:

Q N W J F T J O R V O I D G E * * * * *
U U Y K D E N G I S N U X V C R H L B H
E S B J P W T D C U E E T A V I R P L H
E V N L H I N L A D F F I N T C X J A K
S T R I I * * * * * P N V C H K J B S W
A Y L J L C V S D P R O T E C T E D S Z
V L O O B M V Y L T A K Y P S F F Y L Y

Search for another word (Y/N)? N

Play again (Y/N)? n

Thanks for playing!

BUILD SUCCESS

Total time: 04:09 min
Finished at: 2021-01-24T23:41:31-05:00
Final Memory: 10M/307M

Sample word search puzzle strings:

Word search puzzle strings:

String 1:

X A R O F N S Q\$X B G K V U O D\$Z W H I L E C T

Puzzle 1:

X A R O F N S Q

X B G K V U O D

Z W H I L E C T

Keywords:

do, for, while

String 2:

Q N W J F T J O R V O I D G E S S A L C\$U U Y K D E N G I S N U X V C R H L B H\$E S B J
P W T D C U E E T A V I R P L H\$E V N L H I N L A D F F I N T C X J A K\$S T R I I B R E
A K P N V C H K J B S W\$A Y L J L C V S D P R O T E C T E D S Z\$V L O O B M V Y L T A K
Y P S F F Y L Y

Puzzle 2:

Q N W J F T J O R V O I D G E S S A L C

U U Y K D E N G I S N U X V C R H L B H

E S B J P W T D C U E E T A V I R P L H

E V N L H I N L A D F F I N T C X J A K

S T R I I B R E A K P N V C H K J B S W

A Y L J L C V S D P R O T E C T E D S Z

V L O O B M V Y L T A K Y P S F F Y L Y

Keywords:

bool, break, class, int, private, protected, unsigned, void

String 3:

X O Q J Y T M X H T J U C E H I K V C K N U L L P T R T A R P V A B X M H Q O D\$H P W P
D H C T I W S L Y L H D K V U K S X S G H E L N X H L S X W C N W P A Y\$N R U T E R Y Q
N L A N V I M C K W I W E P P F A M U A G C I T A T S G I E B M\$G O N D L V P Q E S A C
V H K J H E U X R D W D N E W Z X P U Z B F Y Q R S R M\$E L S E U K Z X P S J A K C Q N
A J G H E C A P S E M A N E T E L E D B A Q U Y

Puzzle 3:

X O Q J Y T M X H T J U C E H I K V C K N U L L P T R T A R P V A B X M H Q O D

H P W P D H C T I W S L Y L H D K V U K S X S G H E L N X H L S X W C N W P A Y

N R U T E R Y Q N L A N V I M C K W I W E P P F A M U A G C I T A T S G I E B M

G O N D L V P Q E S A C V H K J H E U X R D W D N E W Z X P U Z B F Y Q R S R M

E L S E U K Z X P S J A K C Q N A J G H E C A P S E M A N E T E L E D B A Q U Y

Keywords:

case, delete, do, else, namespace, new, nullptr, return, static, switch
