

# EC4070: Data Structures and Algorithms

LAB 03

FINAL

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2021/E/075

SEMESTER 4

EC4070

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Q1.

```
Stack1.java Word1.java
1  import java.util.Stack;
2
3  public class Stack1 {
4      public static void main(String[] args) {
5          Stack<String> stack = new Stack<>();
6
7          stack.push("cat");
8          stack.push("dog");
9          stack.push("ant");
10
11         System.out.print("Stack elements: ");
12         System.out.println(stack);
13
14         String topn = stack.peek();
15         System.out.println("Peek (top): " + topn);
16
17         String popn = stack.pop();
18         System.out.println("Pop: " + popn);
19
20         System.out.print("Stack after pop: ");
21         System.out.println(stack);
22
23         int sizen = stack.size();
24         System.out.println("Stack size: " + sizen);
25     }
26 }
27
```

```
C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>java Stack1
Stack elements: [cat, dog, ant]
Peek (top): ant
Pop: ant
Stack after pop: [cat, dog]
Stack size: 2

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>
```

## Q2. 1.

```
Stack1.java x Word1.java x
1  import java.util.Scanner;
2  import java.util.Stack;
3
4  public class Word1{
5      public static void main(String[] args){
6          Scanner x = new Scanner(System.in);
7          System.out.print("Enter your word : ");
8          String word = x.nextLine();
9
10         Stack<Character> stack = new Stack<>();
11
12         for(int i=0; i < word.length();i++){
13             stack.push(word.charAt(i));
14         }
15         System.out.print("Your reverced word is ");
16         while(!stack.isEmpty()){
17             System.out.print(stack.pop());
18         }
19     }
20 }
```

cmd C:\WINDOWS\system32\cmd.exe

Microsoft Windows [Version 10.0.22000.2416]  
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C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>javac Word1.java

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>java Word1

Enter your word : EranDa

Your reverced word is aDnarE

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>

## Q2.2.

```
Stack.java Word1.java Delim.java
1 import java.util.Scanner;
2 import java.util.Stack;
3
4 public class Delim {
5     public static void main(String[] args) {
6         Scanner x = new Scanner(System.in);
7         System.out.print("Enter delimiter word: ");
8         String str = x.nextLine();
9
10        boolean isMatched = checkDM(str);
11
12        if (isMatched) {
13            System.out.println("Delimiters matched.");
14        } else {
15            System.out.println("Delimiters are not matched.");
16        }
17    }
18
19    public static boolean checkDM(String str) {
20        Stack<Character> stack = new Stack<>();
21
22        for (int i = 0; i < str.length(); i++) {
23            char c = str.charAt(i);
24
25            if (c == '(' || c == '[' || c == '{') {
26                stack.push(c);
27            }
28            else if (c == ')' || c == ']' || c == '}') {
29                if (stack.isEmpty()) {
30                    return false;
31                }
32
33                char open = stack.pop();
34
35                if (!isMatchingPair(open, c)) {
36                    return false;
37                }
38            }
39        }
40
41        return stack.isEmpty();
42    }
43
44    public static boolean isMatchingPair(char open, char close) {
45        return (open == '(' && close == ')') || (open == '[' && close == ']') || (open == '{' && close == '}');
46    }
47 }
48
```

C:\> Select C:\WINDOWS\system32\cmd.exe

Microsoft Windows [Version 10.0.22000.2416]  
(c) Microsoft Corporation. All rights reserved.

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>javac Delim.java

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>java Delim  
Enter delimiter word: {er(n[da])}  
Delimiters matched.

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>javac Delim.java

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>java Delim  
Enter delimiter word: {er}rtrt)  
Delimiters are not matched.

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>

### Q3.1.

The screenshot shows an IDE with four tabs: Stack1.java, Word1.java, Delim.java, and Queue1.java. The Queue1.java tab is active, displaying the following code:

```

1  import java.util.LinkedList;
2  import java.util.Queue;
3
4  public class Queue1 {
5      public static void main(String[] args) {
6          Queue<Integer> queue = new LinkedList<>();
7
8          for (int i = 1; i <= 5; i++) {
9              queue.offer(i);
10         }
11
12         displayQueue(queue);
13
14         int removedItem = queue.poll();
15         System.out.println("Dequeued item: " + removedItem);
16
17         displayQueue(queue);
18
19         int frontItem = queue.peek();
20         System.out.println("Front item: " + frontItem);
21
22         boolean isEmpty = queue.isEmpty();
23         System.out.println("Is the queue empty? " + isEmpty);
24     }
25
26     public static void displayQueue(Queue<Integer> queue) {
27         System.out.print("Queue: ");
28         for (int item : queue) {
29             System.out.print(item + " ");
30         }
31         System.out.println();
32     }
33 }

```

Below the IDE, a command prompt window shows the execution of the code:

```

C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.22000.2416]
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C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>javac Word1.java
C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>java Word1
Enter your word : EranDa
Your reverced word is aDnarE
C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>javac Stack1.java
C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>java Stack1
Stack elements: [cat, dog, ant]
Peek (top): ant
Pop: ant
Stack after pop: [cat, dog]
Stack size: 2

C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>javac Queue1.java
C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>java Queue1
Queue: 1 2 3 4 5
Dequeued item: 1
Queue: 2 3 4 5
Front item: 2
Is the queue empty? false
C:\Users\2021E075\OneDrive - University of Jaffna\lab3 com>

```