

ACKNOWLEDGMENT

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TASK 01

1.1 data structures

Data structure is a method to sorting and organize data in a computer so that they can be used effectively. Queue, Stack and linked list are data structures which can be used to maintain the information of the Students according to the given scenario.

Data structures are a solution to manage large amounts of data. Efficient data structures tend to be a key to the design of efficient algorithms. Some recognized design methods and programming languages are the data structures, relatively than algorithms the dominant organization account of software design. Sorting and retrieve can be made on the data stored in main memory and secondary memory.

1.1.1 Stack

Stacks are data structures which maintain the order of last-in, first-out. So Temporary or contract labours are more than permanent employees who are working in a company. And we can assume in a construction companies most of the times newly recruited employee would leave their job. Stack process is also known as Last In First Out (LIFO) therefore this process can be used to maintain the above mentioned requirements of the Student information.

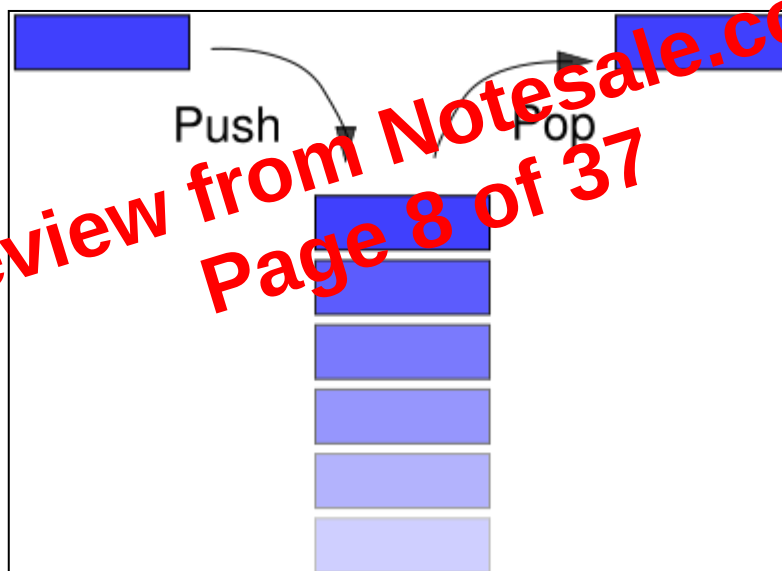


Fig 1.1 representation of stack

Task 05

Recursively defined algorithms are a central part of any advanced programming course and occur in almost every aspect of computer science.. This algorithm will break the problem into smaller piece and allows the function to repeat several times, outputting the result in each end of the iteration. The greatest advantage of this algorithm is it reduces the time and amount code to be written. Because of this reason recursion is an important thing and powerful tool in problem solve in programming.

Recursive Algorithms on Linked Lists

The recursive algorithms depend on a series of method calls to chain along the list, rather than an explicit for loop. The recursive versions of most linked-list algorithms are quite concise and elegant, compared with their iterative counterparts.

According to my system here I used this

```
public static int SemesterPoints(int num)
{
    if (num==0) {
        return 1 ;
    }
    else
        return num*SemesterPoints (num-1) ;
}
```

Fig 5.1 Recursive algorithms

Recursive algorithm in develop solution

- Using recursion we can avoid unnecessary calling of functions also it saves the time of execution.
- A recursive call which passes the simpler problem back into the method.
- A simple base case which we have a solution for and a return value.
- Recursion one can solve problems in easy way while its operative clarification is very big and composite.

6.3 trim();

For removing the blank spaces use trim() method that removes the blank spaces and shows only string. This method removes the blank spaces from both ends of the given string (Front and End). Function is very helpful especially when dealing with user commands. For example in a place where user has to enter employee number to search on particular employee, and mistakenly user has given spaces in the beginning of the employee id. Advantages of trim comes when using this function will remove unnecessary spaces which could lead for bad search output if trim has not been used.

```
public class StringOperation {  
    public static void main(String[] args)  
    {  
        Scanner input = new Scanner(System.in);  
        System.out.println("Enter Student ID");  
        String name = input.nextLine();  
        name = name.trim();  
        if(name.equals("ST001"))  
        {  
            System.out.println("ST_ID:" + name + " Name: Ahmed Arshad");  
        }  
        else if (name.equals("ST002"))  
        {  
            System.out.println("ST_ID:" + name + " Name: Ashwath Kail");  
        }  
        else  
        {  
            System.err.println("Error!! Student Does Not Exist");  
        }  
    }  
}
```

Applying trim

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Fig 6.5 Trim String

As shown above trim function is being used with the name variable, which removes all the white spaces in whatever the string value captured by name variable. So inside the program, a condition is making based on the user entered value.

Output - StringOperation (run)

```
run:  
Enter Student ID  
ST001  
ST_ID:ST001 Name: Ahmed Arshad  
BUILD SUCCESSFUL (total time: 11 seconds)
```

Output if trim used

Fig 6.6 Trim String output

8.1.9 Functional testing

It is to assure that the software meets all the functional requirements. For this program I have choose White box and Black box testing, because it has a specific Advantages than other testing methods did not perform.

8.2 White box testing

White box testing perform base on the knowledge of how the system implement. White box testing includes analysing data flow, information flow, control flow, coding practices, and exclusion and error managing within the system, to test the intentional and unintentional software performance. It can require access to the source code and white box can be performed anytime, after the code developed in the lifecycle.

8.2.1 Advantages of White Box testing

- ✓ All the features and functionality in the submission can be tested.
- ✓ Testing can be started at the very primary stage. Tester does not need to stay for interface or GUI to be ready for testing.
- ✓ Can decrease to number of test cases to be executed through black box testing.
- ✓ Helps in examination coding values and optimizing code.
- ✓ Extra code resulting in hidden defects can be removed.
- ✓ Reason of failure can be known.
- ✓ Identifying test data is easy because coding knowledge will be a pre-requisite.

8.2.2 Disadvantages of White Box testing

- ✓ Tester must be highly skilled because should have the awareness of coding, implementation.
- ✓ Cost of tester is very high.
- ✓ White Box testing is very difficult.
- ✓ It is not possible to look into each piece of code to find out hidden errors.
- ✓ Test cases maintenance can be tough if the implementation changes very frequently.
- ✓ Since White Box Testing it closely tied with the application being testing, tools to cater to every kind of implementation/platform may not be readily available.
- ✓ Exhaustive testing of larger system are not possible.

8.5 Test Plan

Test Plan ID	Test Case Name	Action/Steps	Expected Results
Test Case 1	student ID text box	Inserting no values to student id	An error message should be pop up. Like “Fill student ID”
Test Case 2	Student Name text box	Inserting no values to Employee Name	An error message should be pop up. Like “Fill Employee Name”
Test Case 3	Course name	Inserting no values to Course name	An error message should be pop up. Like “Fill Course name”
Test Case 4	Date of exam	Inserting no values to Date of exam	An error message should be pop up. Like “Fill Date of exam”
Test Case 5	Subject name	Inserting no values to Subject name	An error message should be pop up. Like “Fill Employee DOB”
Test Case 6	Result	Inserting no values to Result	An error message should be pop up. Like “Fill Working Project No”