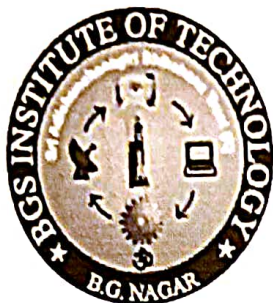


# B G S INSTITUTE OF TECHNOLOGY

B G Nagar - 571448.



## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### LAB COURSE FILE & MANUAL

Academic Year	:	2018 - 2019 (ODD SEMESTER)
Programme (UG/PG)	:	UG
Year / Semester	:	2 <sup>nd</sup> Year / 3 <sup>rd</sup> Semester
Course Code	:	17CSL38
Course Title	:	Data Structures Laboratory

Prepared By:  
**Mrs. Rashmi G R**  
Assistant Professor,  
Department of CS&E  
B G S Institute of Technology

*Rashmi*

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Bangalore, Tq. Mandya Dist.

# B G S INSTITUTE OF TECHNOLOGY

## VISION

BGSIT is committed to the cause of creating tomorrow's engineers by providing quality education inculcating ethical values.

## MISSION

- M1: Imparting quality technical education by nurturing a conducive learning environment.
- M2: Offering professional training to meet industry requirements.
- M3: Providing education with a moral-cultural base and spiritual touch.

# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

## VISION

To produce engineers by possessing good technical knowledge and ethics through quality education and research.

## MISSION

- M1: Achieve excellence by providing good infrastructure and competent faculty.
- M2: Strengthening the technical, soft skills, leadership qualities and ethical values to meet the industry requirements.
- M3: Facilitate experimental learning through research projects.

*Shankar*

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# INSTRUCTIONS TO STUDENTS

## Computer Lab Safety Rules for Protecting Equipment

Turn off the machine once you are done using it.

Do not plug in external devices without scanning them for computer viruses.

Try not to touch any of the circuit boards and power sockets when a device is connected to them and switched on.

Always maintain an extra copy of all your important data files.

## General Safety Guidelines to be followed at all times

All users of the laboratory are to follow the directions of Academic/Laboratory Technician staff member.

Students should not attempt to repair, open, tamper or interfere with any of the computer, printing, cabling, air conditioning or other equipment in the laboratory. Students should be aware of office ergonomic guidelines for correct posture when using computer equipment.

Please treat fellow users of the laboratory, and all equipment within the laboratory, with the appropriate level of care and respect.

## DO's AND DON'TS

### Do's

Enter the log register

Follow the dress code and wear ID card

Always keep quiet. Be considerate to other lab users.

Report any problems with the computer to the person in charge.

Shut down the computer properly and keep the chairs aligned before leaving the lab.

Know the location of the fire extinguisher and the first aid box and how to use them in case of an emergency.

Report any broken plugs or exposed electrical wires to your lecturer/laboratory technician immediately.

### Don'ts

Do not eat or drink in the laboratory.

Do not use mobile phone.

Don't damage, remove, or disconnect any labels, parts, cables or equipment.

Avoid stepping on electrical wires or any other computer cables.

Do not install or download any software or modify or delete any system files on any lab computers.

If you leave the lab, do not leave your personal belongings unattended.

Do not open the system unit casing or monitor casing particularly when the power is turned on.

Do not insert metal objects such as clips, pins and needles into the computer casings. They may cause fire.

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(Effective from the academic year 2017 -2018)			
SEMESTER - III			
Laboratory Code	17CSL38	IA Marks	40
Number of Lecture Hours/Week	011 + 02P	Exam Marks	60
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS - 02			
Descriptions (if any)			
Implement all the experiments in C Language under Linux / Windows environment.			
Laboratory Experiments:			
<p>1. Design, Develop and Implement a menu driven Program in C for the following Array operations</p> <ol style="list-style-type: none"> <li>Creating an Array of N Integer Elements</li> <li>Display of Array Elements with Suitable Headings</li> <li>Inserting an Element (ELEM) at a given valid Position (POS)</li> <li>Deleting an Element at a given valid Position(POS)</li> <li>Exit.</li> </ol> <p>Support the program with functions for each of the above operations.</p> <p>2. Design, Develop and Implement a Program in C for the following operations on Strings</p> <ol style="list-style-type: none"> <li>Read a main String (STR), a Pattern String (PAT) and a Replace String (REP)</li> <li>Perform Pattern Matching Operation: Find and Replace all occurrences of PAT in STR with REP if PAT exists in STR. Report suitable messages in case PAT does not exist in STR</li> </ol> <p>Support the program with functions for each of the above operations. Don't use Built-in functions.</p> <p>3. Design, Develop and Implement a menu driven Program in C for the following operations on STACK of Integers (Array Implementation of Stack with maximum size MAX)</p> <ol style="list-style-type: none"> <li>Push an Element on to Stack</li> <li>Pop an Element from Stack</li> <li>Demonstrate how Stack can be used to check <i>Palindrome</i></li> <li>Demonstrate <i>Overflow</i> and <i>Underflow</i> situations on Stack</li> <li>Display the status of Stack</li> <li>Exit</li> </ol> <p>Support the program with appropriate functions for each of the above operations</p> <p>4. Design, Develop and Implement a Program in C for converting an Infix Expression to Postfix Expression. Program should support for both parenthesized and free parenthesized expressions with the operators: +, -, *, /, %(Remainder), ^(Power) and alphanumeric operands.</p> <p>5. Design, Develop and Implement a Program in C for the following Stack Applications</p> <ol style="list-style-type: none"> <li>Evaluation of Suffix expression with single digit operands and operators: +, -, *, /, %, ^</li> <li>Solving Tower of Hanoi problem with n disks</li> </ol>			

*Shahis*

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6. Design, Develop and Implement a menu driven Program in C for the following operations on **Circular QUEUE** of Characters (Array Implementation of Queue with maximum size **MAX**)
- Insert an Element on to Circular QUEUE
  - Delete an Element from Circular QUEUE
  - Demonstrate *Overflow* and *Underflow* situations on Circular QUEUE
  - Display the status of Circular QUEUE
  - Exit
- Support the program with appropriate functions for each of the above operations

7. Design, Develop and Implement a menu driven Program in C for the following operations on **Singly Linked List (SLL)** of Student Data with the fields: *USN, Name, Branch, Sem, PhNo*
- Create a SLL of N Students Data by using *front insertion*.
  - Display the status of SLL and count the number of nodes in it
  - Perform Insertion / Deletion at End of SLL
  - Perform Insertion / Deletion at Front of SLL (Demonstration of stack)
  - Exit

8. Design, Develop and Implement a menu driven Program in C for the following operations on **Doubly Linked List (DLL)** of Employee Data with the fields: *SSN, Name, Dept, Designation, Sal, PhNo*
- Create a DLL of N Employees Data by using *end insertion*.
  - Display the status of DLL and count the number of nodes in it
  - Perform Insertion and Deletion at End of DLL
  - Perform Insertion and Deletion at Front of DLL
  - Demonstrate how this DLL can be used as **Double Ended Queue**
  - Exit

9. Design, Develop and Implement a Program in C for the following operations on **Singly Circular Linked List (SCLL)** with header nodes
- Represent and Evaluate a Polynomial  $P(x,y,z) = 6x^2y^2z - 4yz^5 + 3x^3yz + 2xy^5z - 2xyz^3$
  - Find the sum of two polynomials  $POLY1(x,y,z)$  and  $POLY2(x,y,z)$  and store the result in  $POLYSUM(x,y,z)$

Support the program with appropriate functions for each of the above operations

10. Design, Develop and Implement a menu driven Program in C for the following operations on **Binary Search Tree (BST)** of Integers
- Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2
  - Traverse the BST in Inorder, Preorder and Post Order
  - Search the BST for a given element (**KEY**) and report the appropriate message
  - Exit

11. Design, Develop and Implement a Program in C for the following operations on **Graph(G)** of Cities
- Create a Graph of N cities using Adjacency Matrix.
  - Print all the nodes **reachable** from a given starting node in a digraph using DFS/BFS method

12. Given a File of  $N$  employee records with a set  $K$  of Keys(4-digit) which uniquely determine the records in file  $F$ . Assume that file  $F$  is maintained in memory by a Hash Table(HT) of  $m$  memory locations with  $L$  as the set of memory addresses (2-digit) of locations in HT. Let the keys in  $K$  and addresses in  $L$  are Integers. Design and develop a Program in C that uses Hash function  $H: K \rightarrow L$  as  $H(K)=K \bmod m$  (remainder method), and implement hashing technique to map a given key  $K$  to the address space  $L$ . Resolve the collision (if any) using linear probing.

**Course outcomes:**

On the completion of this laboratory course, the students will be able to:

- Analyze and Compare various linear and non-linear data structures
- Demonstrate the working nature of different types of data structures and their applications
- Develop, analyze and evaluate the searching and sorting algorithms
- Choose the appropriate data structure for solving real world problems

**Conduction of Practical Examination:**

1. All laboratory experiments (TWELVE nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:15 + 70 +15 (100)
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

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RASHMI GR		Sub: DSL					
DAY/TIME	0.00-0.55	0.55-10.50	11.00-11.55	11.55-12.50	1.45-2.40	2.40-3.35	3.35-4.30
M					DSL A1		
Tu							
W		DSL A2					
Th							
F					DSL A3		
S							

*Shalini*  
Signature of HOD

*Shalini*  
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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CLASS	:	III 'A'
SUBJECT WITH CODE	:	Data Structure (17CSL38)

BATCH - A3	
WEDNESDAY	09:55 AM - 12:55 PM

Sl. No.	USN	NAME
01	4BW17CS050	PUNEETH RAJ B S
02	4BW17CS051	RAHUL B
03	4BW17CS052	RAKESH C S
04	4BW17CS053	RAKSHITHA N
05	4BW17CS054	RAMYA K L
06	4BW17CS055	RANJITHA B S
07	4BW17CS056	RITESH KUMAR CHANDA
08	4BW17CS057	ROHIT KUMAR JHA
09	4BW17CS058	SAHANA L M
10	4BW17CS059	SANJANA GOWDA N C
11	4BW17CS060	SANJAY KUMAR C G
12	4BW17CS061	SHANKREPPA HANDARGAL
13	4BW17CS062	SHIFAALI
14	4BW17CS063	SHRUSTI M
15	4BW17CS064	SIDDARTH SINGH
16	4BW17CS065	SINCHANA B R
17	4BW17CS066	SMITHA B U
18	4BW17CS084	NAMRATHA
19	4BW17CS085	NAYANA
20	4BW17CS086	SOWMYA JAKKULA
21	4BW18CS403	DHANANJAYA
22	4BW18CS404	GAGAN B S
23	4BW18CS406	GIRISH REDDY
24	4BW18CS410	VIDYASAGAR

Staff Incharge1:	<i>Rashmi</i>
Technical Staff:	<i>Rashmi</i>

Staff Incharge2:	<i>Prasanna Kumar</i>
Technical Staff:	<i>Prasanna</i>

Prepared By:

*Rashmi*

Approved By:

*Shashin*

*Shashin*  
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# BGS Institute of Technology

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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CLASS	:
SUBJECT WITH CODE	:

III 'A'
Data Structure (17CSL38)

BATCH - A1	
FRIDAY	01:45 PM - 04:15 PM

BATCH - A2	
MONDAY	01:45 PM - 04:15 PM

Sl. No.	USN	NAME
1.	4BW16CS043	NIHARIKA B R
2.	4BW17CS001	ABHISHEK URS C J
3.	4BW17CS002	AISHWARYA D
4.	4BW17CS003	AISHWARYA G P
5.	4BW17CS004	AISHWARYA K. P
6.	4BW17CS005	AJAY S
7.	4BW17CS006	AKANKASHA K P
8.	4BW17CS008	ANJALI K S
9.	4BW17CS009	ANUPAMA A M
10.	4BW17CS010	ATHFIA FARHEEN N
11.	4BW17CS012	BHAVAN A J
12.	4BW17CS013	BHAVANI N D
13.	4BW17CS014	BHUMIKA M R
14.	4BW17CS015	BINDU H
15.	4BW17CS016	BRUNDA D
16.	4BW17CS017	CHAITHRA R
17.	4BW17CS018	CHAITHRA JAIN H P
18.	4BW17CS020	DEEKSHITHA C
19.	4BW17CS021	DEEPIKA A N
20.	4BW17CS022	DIVYA KHYANI
21.	4BW17CS023	DIVYASHREE K H
22.	4BW17CS024	HARISH GOWDA

Sl. No.	USN	NAME
1.	4BW17CS025	HARSHITHA Y
2.	4BW17CS026	HEMA D
3.	4BW17CS027	INDU SHREE G J
4.	4BW17CS028	ISHWARAPPA HAVIN
5.	4BW17CS029	JEEVAN R
6.	4BW17CS031	JINASHREE P
7.	4BW17CS032	KARTHIK K P
8.	4BW17CS033	KARTHIK M RAO
9.	4BW17CS034	LAKSHMIKANTH GOWDA M
10.	4BW17CS035	MAANYA K V
11.	4BW17CS036	MANJUSHREE C S
12.	4BW17CS037	MANOJ S B
13.	4BW17CS038	MEGHANA K
14.	4BW17CS039	MEGHANA M V
15.	4BW17CS040	NAVYASHREE H D
16.	4BW17CS041	NIKITH G S
17.	4BW17CS042	NOOR AYESHA S
18.	4BW17CS043	POOJA D R
19.	4BW17CS044	POOJA K S
20.	4BW17CS045	POOJASHREE G
21.	4BW17CS046	PRIYADARSHINI P
22.	4BW17CS048	PRIYANKA V L

Staff Incharge1:	Rashmi G. D
Technical Staff:	Jeeva

Staff Incharge2:	
Technical Staff:	

Prepared By: *Rashmi G. D*

Approved By: *Shanku*

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## LABORATORY RUBRICS

### 1. FOR 25 MARKS (2010 SCHEME)

Sl. No.	Description	Marks
1	<u>Continuous Evaluation</u>	<u>15</u>
	a. Observation write up and punctuality	2.5
	b. Conduction of experiment and output	5.0
	c. Viva voice	2.5
	d. Record write up	5.0
2	<u>Internal Test</u>	<u>10</u>

### 2. FOR 20 MARKS (2015 CBCS SCHEME)

Sl. No.	Description	Marks
1	<u>Continuous Evaluation</u>	<u>12</u>
	a. Observation write up and punctuality	2.0
	b. Conduction of experiment and output	4.0
	c. Viva voice	2.0
	d. Record write up	4.0
2	<u>Internal Test</u>	<u>08</u>

### 3. FOR 40 MARKS (2017 REVISED CBCS SCHEME)

Sl. No.	Description	Marks
1	<u>Continuous Evaluation</u>	<u>30</u>
	a. Observation write up and punctuality	5.0
	b. Conduction of experiment and output	10.0
	c. Viva voice	5.0
	d. Record write up	10.0
2	<u>Internal Test</u>	<u>10</u>

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## PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

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- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### PROGRAM SPECIFIC OUTCOMES (PSOs)

**PSO 1:** Ability to apply Mathematical Methodologies, Management Principles and Ethics, Electronics and Embedded Systems and Programming Technologies to solve real time problems.

**PSO 2:** Ability to apply software design and development practices to develop software in emerging areas such as Internet of Things, Data Management, Social Networking and Security, Cloud and High-Performance Computing.

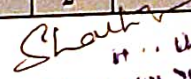
### COURSE OUTCOMES

*Upon successful completion of this course, students should be able to:*

CO1	Examine various types of data structure operations, sorting and searching operations.
CO2	Analyse the performance of stacks, queues, lists.
CO3	Implement all the applications of data structure using high level languages.
CO4	Design and apply appropriate data structure for solving problems.

### CO-PO-PSO MAPPING

COs	POs												PSOs	
	PO1	PO 2	PO3	PO4	PO5	PO 6	P07	PO8	PO 9	P010	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	-	-	-	-	-	-	-	-	2	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	2	-
CO3	3	2	2	2	-	-	-	-	-	-	-	-	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	2	-
AVG			2	1.5	-	-	-	-	-	-	-	-	2	-

  
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SubjectCode:17CSL38  
Hours/Week:03  
Total Hours:50

I.A. Marks :40  
Exam Hours:03  
Exam Marks:80

1. Design, Develop and Implement a menu driven Program in C for the following Array operations

- a. Creating an Array of N Integer Elements
- b. Display of Array Elements with Suitable Headings
- c. Inserting an Element (ELEM) at a given valid Position(POS)
- d. Deleting an Element at a given valid Position(POS)
- e. Exit.Support the program with functions for each of the above operations.

```
#include<stdio.h>
#include <stdlib.h>
//Declaring Global Variables
int a[50],n,pos,element;
//Create an Array with n number of Elements
void createarray()
{
    int i;
    printf("Enter the NO OF ELEMENTS IN an array:");
    scanf("%d",&n);
    printf("enter array elements:\n");
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
}
//Display the Array Elements
void displayarray()
{
    int i;
    printf("The Array Elements are:\n");
    for(i=0;i<n;i++)
        printf("%d\t",a[i]);
}
//Insert an Element at the given Position
void insertelement()
{
    int i;
    printf("Enter the Element and Position to be Inserted\n");
    scanf("%d%d",&element,&pos);
    //Make space for the new element in the given position
    for(i=n-1;i>=pos;i--)
        a[i+1]=a[i];
    a[pos]=element;
    n++;    //Number of elements in the array after inserting
}
//Delete an Element at the given Position
void deleteelement()
{
    int i;
    printf("Enter the Position of the Element to be Deleted\n");
    scanf("%d",&pos);
    printf("The Deleted Element is %d\n",a[pos]);
}
```

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```

//Delete by pushing up other elements

for(i=pos;i<n;i++)
    a[i]=a[i+1];
n--; //Number of elements in the array after deleting
}
//main function
void main()
{
    int ch;
    createarray();
    while(1)
    {
        printf("\n1. Display Array Elements\n2. Insert an Element\n3. Delete an Element\n4. Exit\n");
        printf("Enter Choice:\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1: displayarray();
                    break;
            case 2: insertelement();
                    break;
            case 3: deleteelement();
                    break;
            case 4: exit(0);
                    default: printf("Invalid Choice\n");
        }
    }
}

```

```

1. Display Array Elements
2. Insert an Element
3. Delete an Element
4. Exit
Enter Choice:
1
The Array Elements are:
10      2      4      2
1. Display Array Elements
2. Insert an Element
3. Delete an Element
4. Exit

```

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2. Design, Develop and Implement a Program in C for the following operations on Strings

a. Read a main String (STR), a Pattern String (PAT) and a Replace String (REP)

b. Perform Pattern Matching Operation: Find and Replace all occurrences of PAT in STR with REP if PAT exists in STR.

Report suitable messages in case PAT does not exist in STR

Support the program with functions for each of the above operations. Don't use Built-in functions.

```
#include<stdio.h>
void findandreplace(char str[100],char pat[100],char rep[100])
{
    int i,j,c,m,k,occ=0;
    char res[100];
    i=m=c=j=0;
    while(str[c]!='\0')
    {
        if(str[m]==pat[i] // CharacterMatched
        {
            i++;
            m++;
        }
        if(pat[i]!='\0') //Pattern Found
        {
            occ++;
            printf("Pattern found at %d\n",c);
            for(k=0;rep[k]!='\0';k++,j++) // Copy Replace String in resultString
                res[j]=rep[k];
            i=0;
            c=m;
        }
        else //Pattern NotFound
        {
            res[j]=str[c];
            j++;
            c++;
            m=c;
            i=0;
        }
    } //while
    res[j]='\0';
    if (occ)
    {
        printf("\nNumber of occurrences=%d\n",occ);
        printf("\nThe resultant string is:\n%s\n" ,res);
    }
    else
        printf("Pattern not found\n");
}
```

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```

void main()
{
    char str[100],pat[100],rep[100];

    printf("\nEnter a string \n");
    gets(str);
    printf("\nEnter a search string \n");
    gets(pat);
    printf("\nEnter a replace string \n");
    gets(rep);
    findandreplace(str,pat,rep);
}
    
```

HKBKCE

Enter a search string  
CE

Enter a replace string  
College of Engineering  
Pattern found at 4

Number of occurrences=1

The resultant string is:  
HKBKCollege of Engineering

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3. Design, Develop and Implement a menu driven Program in C for the following operations on STACK of Integers (Array Implementation of Stack with maximum size MAX)

- a. Push an Element on to Stack
- b. Pop an Element from Stack
- c. Demonstrate how Stack can be used to check Palindrome
- d. Demonstrate Overflow and Underflow situations on Stack
- e. Display the status of Stack
- f. Exit Support the program with appropriate functions for each of the above operations

```
#include<stdlib.h>
#include<stdio.h>
#include<math.h>
#define MAX 10
int top=-1,a[MAX];
// function power
int power(int x,int n)
{
    if(n==0) return 1;
    return (x*power(x,n-1));
}
//Push Operation
void push(int item)
{
    if(top==MAX-1)
        printf("Stack Overflow\n");
    else
        a[++top]=item;
}
//Pop operation
int pop()
{
    int itemdel; if (top== -1) return 0; else
    {
        itemdel=a[top--]; return itemdel;
    }
}
//Display function
void display()
{
    int i;
    if(top== -1)
        printf("Stack Empty\n");
    else
    {
        printf("Elements Are:\n"); for(i=top;i>=0;i--)
        printf("%d\n",a[i]);
    }
}
```

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```

//Palindrome
void palindrome(int num)
{
    intcount=0,rem,i,rev=0,n=num,item; while(n!=0)
    {
        rem=n%10; push(rem); n=n/10; count++;
    }
    for(i=0;i<count;i++)
    {
        item=pop();
        rev=item*power(10,i)+rev;
    }
    printf("Reversed Number=%d\n",rev); if(num==rev)
    printf("Palindrome"); else
    printf("Not a Palindrome");
}

//Main function
void main()
{
    int ch,item,num,itemdel;
    while(1)
    {
        printf("\nEnter the Choice\n1.Push\n2.Pop\n3.Display\n4.Palindrome\n5.Exit\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1: printf("Enter item to be inserted\n");
                    scanf("%d",&item);
                    push(item); break;
            case 2: itemdel=pop();
                    if(itemdel)
                        printf("\n Deleted Item is:%d\n",itemdel);
                    else
                        printf("Stack Underflow\n");
                    break;
            case 3: display();
                    break;
            case 4: printf("Enter the Number:\n");
                    scanf("%d",&num);
                    palindrome(num);
                    break;
            case 5: exit(0);
        }
    }
}

```

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```
Enter item to be inserted
```

```
20
```

```
Enter the Choice
```

```
1.Push
```

```
2.Pop
```

```
3.Display
```

```
4.Palindrome
```

```
5.Exit
```

```
3
```

```
Elements Are:
```

```
20
```

```
10
```

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4. Design, Develop and Implement a Program In C for converting an Infix Expression to Postfix Expression.

Program should support for both parenthesized and free parenthesized expressions with the operators: +, -, \*, /, %(Remainder),^(Power) and alphanumeric operands.

```
#include<stdio.h>
chara[25];
inttop=-1;

void push(char symbol)
{
    a[++top]=symbol;
}

char pop()
{
    Charitem;
    item=a[top--];
    return(item);
}

int preced(char op)
{
    int r;
    switch(op)
    {
        case '^': r=3;break; case '*':
        case '/':
        case '%': r=2;break; case '+':
        case '-':r=1;break;
        case '(':r=0;break;
        case '#': r=-1;break;
    }
    return(r);
}

void infix_postfix(char infix[],char postfix[])
{
    inti,p=0;
    charsymbol,item; push('#');
    for (i=0;infix[i]!='\0';i++)
    {
        symbol=infix[i]; switch(symbol)
        {
            case '(': push(symbol); break;
            case ')':item=pop();
            while(item!='(')
            {
                postfix[p++]=item; item=pop();
            }
            break; case '+':
            case '-':
            case '*':
```

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```

        case '^':
        case '^*':
        case '%': while(preced(a[top])>=preced(symbol))
            {
                item=pop(), postfix[p++]=item;
            }
        push(symbol); break;
        default: postfix[p++]=symbol; break;
    }
}
while(top>0)
{
    item=pop(); postfix[p++]=item;
}
postfix[p]='\0';
}
void main()
{
    char infix[25],postfix[25];
    printf("Enter the Infix Expression:\n");
    scanf("%s",infix); infix_postfix(infix,postfix);
    printf("Postfix Expression: %s\n",postfix);
}

```

```

C:\TURBOC3\BIN>TC
Enter the Infix Expression:
a+b
Postfix Expression: ab+
_

```

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```

5. Evaluation of Suffix expression with single digit operands and operators: +, -, *, /, %, ^
#include<stdio.h>
#include<math.h>
float s[25];
int top=-1;
float operation(char op,float op1,float op2)
{
    switch(op)
    {
        case '+': return(op1+op2);
        case '-': return(op1-op2);
        case '*': return(op1*op2);
        case '/': return(op1/op2);
        case '^': return(pow(op1,op2));
        case '%': return((int)op1%(int)op2);
    }
    return (0);
}
void push(float symbol)
{
    s[++top]=symbol;
}
float pop()
{
    return(s[top--]);
}
void main()
{
    char postfix[25],symbol;
    float op1,op2,res;int i;
    printf("Enter the Postfix Expression\n");
    scanf("%s",postfix);
    for(i=0;postfix[i]!='\0';i++)
    {
        symbol=postfix[i];
        if(isdigit(symbol))
            push(symbol-'0');
        else
        {
            op2=pop();
            op1=pop();
            res=operation(symbol,op1,op2);
            push(res);
        }
    }
    res=pop();
    printf("Result=%.2f",res);
}

```

```

Enter the Postfix Expression
12+
Result=3.00_

```

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6. Design, Develop and Implement a menu driven Program in C for the following operations on Circular QUEUE of Characters (Array Implementation of Queue with maximum size MAX)
- Insert an Element on to CircularQUEUE
  - Delete an Element from CircularQUEUE
  - Demonstrate Overflow and Underflow situations on CircularQUEUE
  - Display the status of CircularQUEUE
  - Exit

Support the program with appropriate functions for each of the above operations

```
#include <stdio.h>
#include <stdlib.h>
#define MAX 5
int a[MAX], f=0, r=-1, count=0;
void insert (int item)
{
    if (count==MAX)
        printf("Q Overflow\n");
    else
    {
        r=(r+1)%MAX;
        a[r]=item;
        count=count+1;
    }
}
int delet()
{
    int itemdel;
    if(count==0)
        return 0;
    else
    {
        itemdel=a[f];
        f=(f+1)%MAX;
        count=count-1;
        return(itemdel);
    }
}
void display()
{
    int i,j;
    if (count==0)
        printf("Qempty\n");
    else
    {
        i=f;
        for (j=1;j<=count;j++)
        {
            printf("%d\t",a[i]);
            i=(i+1)%MAX;
        }
    }
}
```

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```

void main()
{
    int ch,item,itemdel;
    while (1)
    {
        printf("\nEnter the choice\n");
        printf("1.Insert\2.Delete\3.Display\4.Exit\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1: printf("Enter the item\n");
                    scanf("%d",&item);
                    insert(item);
                    break;
            case 2: itemdel=delet();
                    if (itemdel)
                        printf("The deleted item is %d\n",itemdel);
                    else
                        printf("Queue underflow\n");
                    break;
            case 3: display();
                    break;
            case 4: exit(0);
        }
    }
}
    
```

```

1.Insert      2.Delete      3.Display      4.Exit
1
Enter the item
10
Enter the choice
1.Insert      2.Delete      3.Display      4.Exit
3
10
Enter the choice
1.Insert      2.Delete      3.Display      4.Exit
1
    
```

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7. Design, Develop and Implement a menu driven Program in C for the following operations on Singly Linked List (SLL) of Student Data with the fields: USN, Name, Branch, Sem, PhNo

- Create a SLL of N Students Data by using front insertion.
- Display the status of SLL and count the number of nodes in it
- Perform Insertion and Deletion at End of SLL
- Perform Insertion and Deletion at Front of SLL
- Demonstrate how this SLL can be used as STACK and QUEUE
- Exit

```
#include<stdio.h>
#include<string.h>
#include<stdlib.h>
struct student
{
    char usn[12];
    char name[25];
    char branch[25];
    int sem;
    int phone_no;
    struct student *link;
};
typedef struct student STUD;

STUD *read_data()
{
    char usn[12], name[25], branch[25];
    int sem, phone_no;
    STUD *temp;
    temp = (STUD *) malloc(sizeof(STUD));
    printf("Enter the Students Details:\n");
    printf("Enter USN\n");
    scanf("%s", usn);
    strcpy(temp->usn, usn);
    printf("Enter Name\n");
    scanf("%s", name);
    strcpy(temp->name, name);
    printf("Enter Branch\n");
    scanf("%s", branch);
    strcpy(temp->branch, branch);
    printf("Enter Semester\n");
    scanf("%d", &sem);
    temp->sem = sem;
    printf("Enter Phone Number\n");
    scanf("%d", &phone_no);
    temp->phone_no = phone_no;
    temp->link = NULL;
    return temp;
}
```

```
STUD *insert_front(STUD *first)
{
    STUD *temp;
    temp = read_data();
```

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```

temp->link=first;
return temp;
}

STUD *insert_end(STUD *first)
{
    STUD *temp,*prev;
    temp=read_data();
    if(first==NULL)
        return temp;
    prev=first;
    while(prev->link!=NULL)
        prev=prev->link;
    prev->link=temp;
    return first;
}

STUD *delete_front(STUD *first)
{
    STUD *cur;
    if(first==NULL)
    {
        printf("List is empty\n");
        return first;
    }
    cur=first;
    first=first->link;
    free(cur);
    return first;
}

STUD *delete_end(STUD *first)
{
    STUD *prev,*cur;
    if(first==NULL)
    {
        printf("List is empty\n");
        return first;
    }
    prev=NULL;
    cur=first;
    while(cur->link!=NULL)
    {
        prev=cur;
        cur=cur->link;
    }
    prev->link=NULL;
    free(cur);
    return first;
}

```

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```

void display(STUD *first)
{
    STUD *temp;
    int count=0;
    if(first==NULL)
    {
        printf("List is empty\n");
        return;
    }
    printf("USN\NAME\BRANCH\SEM\PHONE NO.\n");
    temp=first;
    while (temp!=NULL)
    {
        printf("%s\t%s\t%s\t%d\t%d\n",temp->usn,temp->name,temp->branch,temp->sem,temp->phone_no);
        temp=temp->link;
        count++;
    }
    printf("The number of nodes in SLL=%d\n",count);
}

```

```

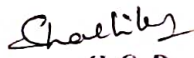
void stack()
{
    int ch;
    STUD *first=NULL;
    while (1)
    {
        printf("1.Push\n2.Pop\n3.Display\n4.Exit\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1: first=insert_front(first);
                    break;
            case 2: first=delete_front(first);
                    break;
            case 3: display(first);
                    break;
            case 4: return;
        }
    }
}

```

```

void queue()
{
    int ch;
    STUD *first=NULL;
    while (1)
    {
        printf("1.Insert\n2.Delete\n3.Display\n4.Exit\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1: first=insert_end(first);
                    //display(first);
                    break;

```

  
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```

        case 2: first=delete_front(first);
            //display(first);
            break;
        case 3: display(first);
            break;
        case 4: return;
    }
}

void main()
{
    int ch,i,n;
    STUD *first=NULL;
    printf("Creation of SLL of N Students\n");
    printf("Enter the number of students\n");
    scanf("%d",&n);
    for(i=1;i<=n;i++)
        first=insert_front(first);
    printf("SLL Created Successfully!!!\n");
    display(first);
    while(1)
    {
        printf("1.Display\n2.Insert End\n3>Delete End\n4.Insert Front\n5.Delete
        Front\n6.Stack\n7.Queue\n8.Exit\n");
        printf("Enter the choice\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1: display(first);
                break;
            case 2: first=insert_end(first);
                printf("Node Inserted at theEnd\n");
                break;
            case 3: first=delete_end(first);
                printf("Node deleted at the End\n");
                break;
            case 4: first=insert_front(first);
                printf("Node Inserted at Front\n");
                break;
            case 5: first=delete_front(first);
                printf("Node deleted atFront\n");
                break;
            case 6: stack();
                break;
            case 7: queue();
                break;
            case 8: exit(0);
        }
    }
}

```

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```
1.Push
2.Pop
3.Display
4.Exit
3
USN      NAME      BRANCH  SEM
1        abc      csc     6
The number of nodes in SLL=1
1.Push
2.Pop
3.Display
4.Exit
```

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8. Design, Develop and Implement a menu driven Program in C for the following operations on Binary Search Tree (BST) of Integers
  - a. Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2
  - b. Traverse the BST in Inorder, Preorder and PostOrder
  - c. Search the BST for a given element (KEY) and report the appropriate message
  - d. Delete an element(ELEM) from BST
  - e. Exit

```
#include<stdio.h>
#include<stdlib.h>
struct node
{
    int info;
    struct node *llink;
    struct node *rlink;
};
typedef struct node NODE;
NODE *insert(int item,NODE *root)
{
    NODE *temp,*cur,*prev;
    temp=(NODE*)malloc(sizeof(NODE));
    temp->info=item;
    temp->llink=NULL;
    temp->rlink=NULL;
    if(root==NULL)
    return temp;
    prev=NULL;
    cur=root;
    while(cur!=NULL)
    {
        prev=cur;
        cur=(item<cur->info)?cur->llink:cur->rlink;
    }
    if(item<prev->info)
    prev->llink=temp;
    else
    prev->rlink=temp;
    return root;
}
NODE *construct_BST(NODE *root)
{
    int a,n,i;
    printf("Enter the number of elements\n");
    scanf("%d",&n);
    printf("Enter the elements to be inserted in the tree\n");
    for(i=0;i<n;i++)
    {
        scanf("%d",&a);
        root=insert(a,root);
    }
    printf("Tree Constructed Successfully!!!!\n");
    return root;
}
```

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```

void preorder(NODE *root)
{
    if(root!=NULL)
    {
        printf("%d\t",root->info);
        preorder(root->llink);
        preorder(root->rlink);
    }
}

void inorder(NODE *root)
{
    if(root!=NULL)
    {
        inorder(root->llink);
        printf("%d\t",root->info);
        inorder(root->rlink);
    }
}

void postorder(NODE *root)
{
    if(root!=NULL)
    {
        postorder(root->llink);
        postorder(root->rlink);
        printf("%d\t",root->info);
    }
}

int search_element(NODE *root,int key)
{
    NODE *cur;
    int n=0;
    cur=root;
    if (cur!=NULL)
    {
        if (key==cur->info)
            n=1;
        else if (key<cur->info)
            return search_element(cur->llink,key);
        else
            return search_element(cur->rlink,key);
    }
    else
        return n;
}

NODE *minValueNode(NODE* node)
{
    NODE *current = node;
    /* loop to find the leftmost leaf */
    while (current->llink != NULL)
        current = current->llink;
    return current;
}

```

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```

NODE *delete_element(NODE *root,int key)
{
    if (root == NULL)
        return root;
    if (key < root->info)
        root->llink = delete_element(root->llink, key);
    else if (key > root->info)
        root->rlink = delete_element(root->rlink, key);
    else
    {
        // node with only one child or no child
        if (root->llink == NULL)
        {
            NODE *temp = root->rlink;
            free(root);
            return temp;
        }
        else if (root->rlink == NULL)
        {
            NODE *temp = root->llink;
            free(root);
            return temp;
        }
        // node with two children: Get the inorder successor (smallest
        // in the right subtree)
        else
        {
            NODE *temp = minValueNode(root->rlink);
            root->info = temp->info;
            root->rlink = delete_element(root->rlink, temp->info);
        }
    }
    return root;
}

void main()
{
    int item,ch,key,n;
    NODE *root;
    root=NULL;
    while (1)
    {
        printf("\nEnter the choice\n1. Construct BST\n2. Preorder\n3. Inorder\n4. Postorder\n5. Search an
        Element\n6. Delete an Element\n7: Exit\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1: root=construct_BST(root);
                    break;
            case 2: preorder(root);
                    break;
            case 3: inorder(root);
                    break;
        }
    }
}

```

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```

case 4: postorder(root);
        break;
case 5: if (root==NULL)
        printf("List Empty\n");
        else
        {
            printf("Enter the element\n");
            scanf("%d",&key);
            n=search_element(root,key);
            if(n)
                printf("Key found\n");
            else
                printf("Not found\n");
        }
        break;
case 6: if (root==NULL)
        printf("List Empty\n");
        else
        {
            printf("Enter the element\n");
            scanf("%d",&key);
            n=search_element(root,key);
            if(n)
                root=delete_element(root,key);
            else
                printf("Not found\n");
        }
        break;
case 7: exit(0);
default: printf("Wrong Choice\n");
}
}
}

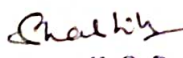
```

```

30
5
2
Tree Constructed Successfully!!!!!!

Enter the choice
1. Construct BST
2. Preorder
3. Inorder
4. Postorder
5. Search an Element
6. Delete an Element
7: Exit

```

  
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9. Design, Develop and Implement a Program in C for the following operations on Graph(G) of Cities

- Create a Graph of N cities using Adjacency Matrix.
- Print all the nodes reachable from a given starting node in a digraph using BFS method
- Check whether a given graph is connected or not using DFS method.

```
#include<stdio.h>

int a[10][10],q[10],visit[10],n,i,j;

void bfs(int v)
{
    static int f=0,r=-1;
    for(i=0;i<n;i++)
        if(a[v][i]==1 && visit[i]==0)
            q[++r]=i;
    if(f<r)
    {
        visit[q[f]]=1;
        bfs(q[f++]);
    }
}

void dfs(int u)
{
    int i;
    visit[u]=1;
    for(i=0;i<n;i++)
        if(a[u][i]==1 && visit[i]==0)
            dfs(i);
}

main()
{
    int v,f=1;
    printf("\nEnter the number of nodes\n");
    scanf("%d",&n);
    printf("\nEnter the adjacency matrix\n");
    for(i=0;i<n;i++)
        for(j=0;j<n;j++)
            scanf("%d",&a[i][j]);
    for(i=0;i<n;i++)
        visit[i]=0;
    printf("Enter the starting vertex\n");
    scanf("%d",&v);
    visit[v]=1;
    bfs(v);

    printf("Nodes reachable from vertex %d:\n",v);
    for(i=0;i<n;i++)
        if(visit[i]==1 && i!=v)
            printf("%d\n",i);
}
```

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```
//Graph connected or not
for(i=0;i<n;i++)
    visit[i]=0;
dfs(0);
for(i=0;i<n;i++)
    if(visit[i]==0)
    {
        f=0;
        break;
    }
if(f==0)
    printf("\nThe Given Graph is not connected\n");
else
    printf("\nThe Given Graph is connected\n");
}
```

```
Enter the adjacency matrix
0 1 1
0 0 1
1 1 0
0 1 1
Enter the starting vertex
Nodes reachable from vertex 1:
0
2
The Given Graph is connected
```

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10. Given a File of N employee records with a set K of Keys(4-digit) which uniquely determine the records in file F. Assume that file F is maintained in memory by a Hash Table(HT) of m memory locations with L as the set of memory addresses (2-digit) of locations in HT. Let the keys in K and addresses in L are Integers. Design and develop a Program in C that uses Hash function  $H: K \rightarrow L$  as  $H(K)=K \text{ mod } m$  (remainder method), and implement hashing technique to map a given key K to the address space L. Resolve the collision (if any) using linear probing.

```
#include <stdio.h>
#define m 10
int HT[10];
int hash(int key)
{
    return key%m;
}
void linear_probe(int hk,int key)
{
    int i,flag=0;
    for (i=hk+1;i<m;i++)
    {
        if (HT[i]==999)
        {
            HT[i]=key;
            flag=1;
            break;
        }
    }
    for(i=0;i<key&&flag==0;i++)
    {
        if (HT[i]==999)
        {
            HT[i]=key;
            flag=1;
            break;
        }
    }
    if (!flag)
        printf("HASH Table is Full!!!\n");
}
void main()
{
    int N,i,key,hk;
    for(i=0;i<m;i++)
        HT[i]=999;
    printf("Enter the Number of Employees:\n");
    scanf("%d",&N);
    printf("Enter the Employee Keys\n");
    for(i=1;i<=N;i++)
    {
        scanf("%d",&key);
        hk=hash(key);
        if (HT[hk]==999)
            HT[hk]=key;
    }
}
```

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 Karnataka (INDIA)

```

else
{
printf("Collision\n");
//printf("Collision solved by Linear Probing\n");
linear_probe(hk,key);
}
}
printf(".....\n");
printf("HASH TABLE\n");
printf(".....\n");
printf("Address\tKeys\n");
for (i=0;i<m;i++)
printf("%d\t%d\n",i,HT[i]);
}

```

Address	Keys
0	100
1	999
2	999
3	999
4	999
5	999
6	999
7	999
8	999
9	999

```

/*solving collision using linear probing*/
#include <stdio.h>
#define m 20
int HT[10];
int hash(int key)
{
return key%m;
}
void linear_probe(int hk,int key)
{
int i,flag=0;
for (i=hk+1;i<m;i++)
{
if (HT[i]==999)
{
HT[i]=key;
}
}
}

```

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Maddur Tal. Mandya Dist  
KARNATAKA (INDIA)

```

        flag=1;
        break;
    }
}

for(i=0;i<hk&&flag==0;i++)
{
    if(HT[i]==999)
    {
        HT[i]=key;
        flag=1;
        break;
    }
}

if(!flag)
    printf("HASH Table is Full!!!\n");
}

void main()
{
    FILE *fp;
    int N,i,key,hk;
    char name[100];
    for (i=0;i<mi;i++)
        HT[i]=999;
    fp=fopen("emp.txt","r");
    while(!feof(fp))
    {
        fscanf(fp,"%d%s",&key,name);
        hk=hash(key);
        if (HT[hk]==999)
            HT[hk]=key;
        else
        {
            printf("Collision for key %d:\n",key);
            printf("Collision solved by Linear Probing\n\n");
            linear_probe(hk,key);
        }
    }
    printf(".....\n");
    printf("HASH TABLE\n");
    printf(".....\n");
    printf("Address\tKeys\n");
    for (i=0;i<m;i++)
        printf("%d\t%d\n",i,HT[i]);
}

```

**HASH Table is Full!!!  
Collision for key 0:  
Collision solved by Linear Probing**

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## COURSE\_WISE 2018-19

Batch : BE , 2017-2021

Staff Name : Ms Rashmi G R

Subject Code : 17CSL38

Subject Name : DATA STRUCTURES  
LABORATORY

Department : Computer Science and  
Engineering

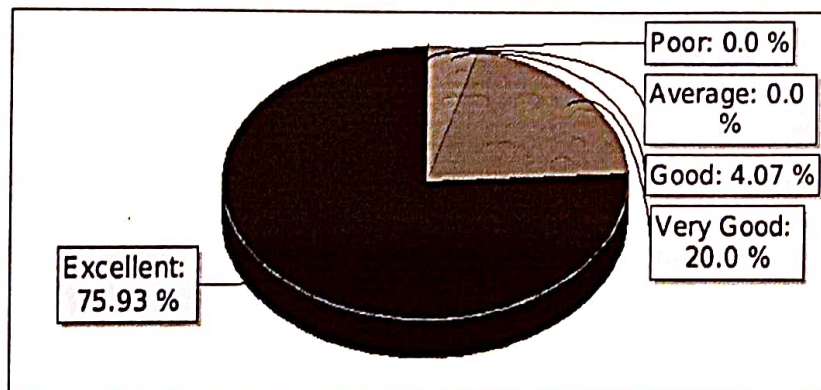
Semester 3 , Sec : A , Batch: 1

Date : 23 Nov 2018

No	Questions	Poor	Average	Good	Very Good	Excellent	Feedback Percentage	Average Score (5)
		1	2	3	4	5		
<i>Time Sense</i>								
1	Teacher conducts the classes regularly	0	0	0	2	8	96	4.8
2	Syllabus of this course is completed in time	0	0	0	2	8	96	4.8
3	Assignments, class tests, quizzes and seminars were conducted as per schedule	0	0	0	2	8	96	4.8
4	Alternate arrangements were made during his/her absence	0	0	0	2	8	96	4.8
<i>Class Control/Management</i>								
1	The faculty is effective in controlling and conducting the class	0	0	1	1	8	94	4.7
2	The faculty invites student participation.	0	0	1	1	8	94	4.7
3	The faculty rightfully addresses inappropriate behaviour of students	0	0	1	2	7	92	4.6
4	The faculty has a tendency of inviting opinion and questions on subject matter from students	0	0	1	1	8	94	4.7
5	The faculty enhances learning by judicious reinforcement mechanism	0	0	1	2	7	92	4.6
<i>Subject Command</i>								
1	The faculty focused on the defined syllabus	0	0	0	2	8	96	4.8
2	The faculty conducted and involved students in classroom discussions	0	0	0	2	8	96	4.8
3	The faculty had good communication skills	0	0	0	2	8	96	4.8
4	The lectures were well structured	0	0	0	3	7	94	4.7
5	The faculty related the subject to real life applications of concepts	0	0	0	3	7	94	4.7
6	The faculty referred to latest developments in the fields	0	0	0	3	7	94	4.7
<i>Use of Teaching Aid</i>								
1	The faculty used different teaching aids like PPT's, Blackboard, Overhead Projectors etc	0	0	1	3	6	90	4.5
2	The blackboard/whiteboard work was clear in terms of legibility, visibility and structure	0	0	1	1	8	94	4.7

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3	The faculty used different teaching methods in conducting the class. (Example group discussion, seminars, student presentations, etc.)	0	0	1	3	6	90	4.5
4	The faculty shared and discussed the answers to class tests or sessional tests	0	0	1	1	8	94	4.7
5	The faculty allowed the review of answer scripts of class tests	0	0	1	3	6	90	4.5
6	The faculty made sure all students are able to understand him/her.	0	0	1	1	8	94	4.7
<b>Helping Attitude</b>								
1	The faculty has a helping attitude towards varied academic interests of students.	0	0	0	2	8	96	4.8
2	The faculty helps students gain access to material not readily available in text books, through e-resources, e-journals, reference books etc	0	0	0	2	8	96	4.8
3	The faculty has helps students facing physical, emotional and learning challenges.	0	0	0	2	8	96	4.8
4	The faculty's approach is towards development of professional skills among students	0	0	0	2	8	96	4.8
5	The faculty helps students in realizing career goals	0	0	0	2	8	96	4.8
6	The faculty helps students in realizing their strengths and development needs	0	0	0	2	8	96	4.8
Total Count		0	0	11	54	205	94.4	4.72



Comments
Good teaching
Awesome
Taught all the program along with tracing so that we will not forget any of the logics.
She explained output of all programs and thought error debugging methods
She Explained all the program and their error debugging method.
.
#
Very good
Ur teaching is very good mam





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## COURSE\_WISE 2018-19

Batch : BE , 2017-2021

Staff Name : Ms Rashmi G R

Subject Code : 17CSL38

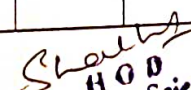
Subject Name : DATA STRUCTURES  
LABORATORY

Department : Computer Science and  
Engineering

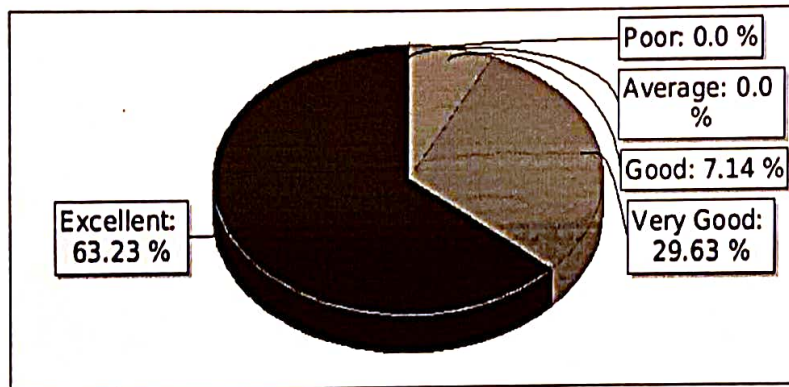
Semester 3 , Sec : A , Batch: 2

Date : 23 Nov 2018

No	Questions	Poor	Average	Good	Very Good	Excellent	Feedback Percentage	Average Score (5)
		1	2	3	4	5		
<b>Time Sense</b>								
1	Teacher conducts the classes regularly	0	0	1	3	10	92.9	4.6
2	Syllabus of this course is completed in time	0	0	1	4	9	91.4	4.6
3	Assignments, class tests, quizzes and seminars were conducted as per schedule	0	0	1	4	9	91.4	4.6
4	Alternate arrangements were made during his/her absence	0	0	1	3	10	92.9	4.6
<b>Class Control/Management</b>								
1	The faculty is effective in controlling and conducting the class	0	0	1	3	10	92.9	4.6
2	The faculty invites student participation.	0	0	1	5	8	90	4.5
3	The faculty rightfully addresses inappropriate behaviour of students	0	0	1	4	9	91.4	4.6
4	The faculty has a tendency of inviting opinion and questions on subject matter from students	0	0	1	3	10	92.9	4.6
5	The faculty enhances learning by judicious reinforcement mechanism	0	0	1	4	9	91.4	4.6
<b>Subject Command</b>								
1	The faculty focused on the defined syllabus	0	0	1	4	9	91.4	4.6
2	The faculty conducted and involved students in classroom discussions	0	0	1	5	8	90	4.5
3	The faculty had good communication skills	0	0	1	4	9	91.4	4.6
4	The lectures were well structured	0	0	1	5	8	90	4.5
5	The faculty related the subject to real life applications of concepts	0	0	1	5	8	90	4.5
6	The faculty referred to latest developments in the fields	0	0	1	3	10	92.9	4.6
<b>Use of Teaching Aid</b>								
1	The faculty used different teaching aids like PPT's, Blackboard, Overhead Projectors etc	0	0	1	5	8	90	4.5
2	The blackboard/whiteboard work was clear in terms of legibility, visibility and structure	0	0	1	5	8	90	4.5

  
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3	The faculty used different teaching methods in conducting the class. (Example group discussion, seminars, student presentations, etc.)	0	0	1	5	8	90	4.5
4	The faculty shared and discussed the answers to class tests or sessional tests	0	0	1	4	9	91.4	4.6
5	The faculty allowed the review of answer scripts of class tests	0	0	1	4	9	91.4	4.6
6	The faculty made sure all students are able to understand him/her.	0	0	1	4	9	91.4	4.6
<b>Helping Attitude</b>								
1	The faculty has a helping attitude towards varied academic interests of students.	0	0	1	4	9	91.4	4.6
2	The faculty helps students gain access to material not readily available in text books, through e-resources, e-journals, reference books etc	0	0	1	4	9	91.4	4.6
3	The faculty has helps students facing physical, emotional and learning challenges.	0	0	1	5	8	90	4.5
4	The faculty's approach is towards development of professional skills among students	0	0	1	4	9	91.4	4.6
5	The faculty helps students in realizing career goals	0	0	1	4	9	91.4	4.6
6	The faculty helps students in realizing their strengths and development needs	0	0	1	5	8	90	4.5
Total Count		0	0	27	112	239	91.2	4.57



Comments
It's a good subject
Good lecturer
Good teaching
It's a good subject
Good subject
Excellent
Very excellent teaching
Good teaching
the teaching is good
Excellent



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## COURSE\_WISE 2018-19

Batch : BE , 2017-2021

Staff Name : Ms Rashmi G R

Subject Code : 17CSL38

Subject Name : DATA STRUCTURES  
LABORATORY

Department : Computer Science and  
Engineering

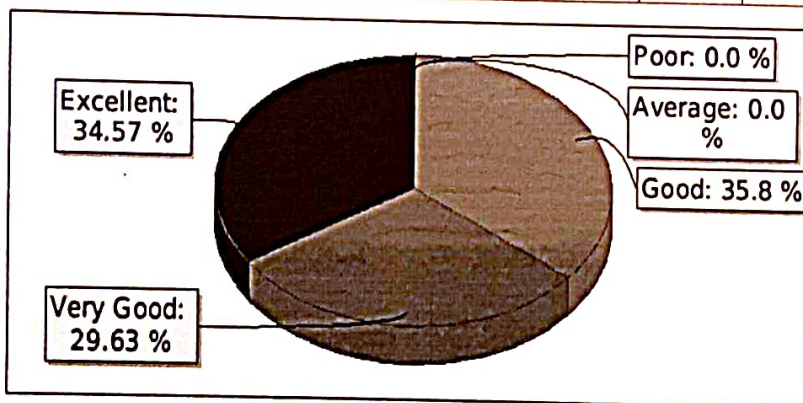
Semester 3 , Sec : A , Batch: 3

Date : 23 Nov 2018

No	Questions	Poor	Average	Good	Very Good	Excellent	Feedback Percentage	Average Score (5)
		1	2	3	4	5		
<i>Time Sense</i>								
1	Teacher conducts the classes regularly	0	0	1	1	1	80	4
2	Syllabus of this course is completed in time	0	0	0	2	1	86.7	4.3
3	Assignments, class tests, quizzes and seminars were conducted as per schedule	0	0	1	1	1	80	4
4	Alternate arrangements were made during his/her absence	0	0	1	1	1	80	4
<i>Class Control/Management</i>								
1	The faculty is effective in controlling and conducting the class	0	0	1	1	1	80	4
2	The faculty invites student participation.	0	0	1	1	1	80	4
3	The faculty rightfully addresses inappropriate behaviour of students	0	0	1	0	2	86.7	4.3
4	The faculty has a tendency of inviting opinion and questions on subject matter from students	0	0	2	0	1	73.3	3.7
5	The faculty enhances learning by judicious reinforcement mechanism	0	0	1	1	1	80	4
<i>Subject Command</i>								
1	The faculty focused on the defined syllabus	0	0	2	0	1	73.3	3.7
2	The faculty conducted and involved students in classroom discussions	0	0	1	1	1	80	4
3	The faculty had good communication skills	0	0	1	1	1	80	4
4	The lectures were well structured	0	0	1	1	1	80	4
5	The faculty related the subject to real life applications of concepts	0	0	2	0	1	73.3	3.7
6	The faculty referred to latest developments in the fields	0	0	0	2	1	86.7	4.3
<i>Use of Teaching Aid</i>								
1	The faculty used different teaching aids like PPT's, Blackboard, Overhead Projectors etc	0	0	2	0	1	73.3	3.7
2	The blackboard/whiteboard work was clear in terms of legibility, visibility and structure	0	0	0	2	1	86.7	4.3

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3	The faculty used different teaching methods in conducting the class. (Example group discussion, seminars, student presentations, etc.)	0	0	1	1	1	80	4
4	The faculty shared and discussed the answers to class tests or sessional tests	0	0	1	1	1	80	4
5	The faculty allowed the review of answer scripts of class tests	0	0	1	1	1	80	4
6	The faculty made sure all students are able to understand him/her.	0	0	1	1	1	80	4
<b>Helping Attitude</b>								
1	The faculty has a helping attitude towards varied academic interests of students.	0	0	2	0	1	73.3	3.7
2	The faculty helps students gain access to material not readily available in text books, through e-resources, e-journals, reference books etc	0	0	1	1	1	80	4
3	The faculty has helps students facing physical, emotional and learning challenges.	0	0	0	2	1	86.7	4.3
4	The faculty's approach is towards development of professional skills among students	0	0	2	0	1	73.3	3.7
5	The faculty helps students in realizing career goals	0	0	0	2	1	86.7	4.3
6	The faculty helps students in realizing their strengths and development needs	0	0	2	0	1	73.3	3.7
Total Count		0	0	29	24	28	79.8	3.99



Comments
Best
Best teach
Excellent teaching

*Shalsh*  
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[Not for Circulation]

**BGS Institute of Technology**  
BG Nagar-571448, Mandya

Result Analysis

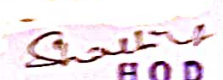
Course Coordinator: RASHMI G R  
Course Name & Code: Data Structure Lab 17CSI38  
Semester & Sec 3rd sem  
Academic Year 2018-19

Sl. No.	USN	NAME	IA	SEE	Total	Result
1	4BW16CS043	NIHARIKA B R				PASS
2	4BW17CS001	ABHISHEK URS C J	35	45	80	PASS
3	4BW17CS002	AISHWARYA D	33	51	84	PASS
4	4BW17CS003	AISHWARYA G P	34	51	85	PASS
5	4BW17CS004	AISHWARYA K. P	33	46	79	PASS
6	4BW17CS005	AJAY S	39	59	98	PASS
7	4BW17CS006	AKANKASHA K P	36	52	98	PASS
8	4BW17CS008	ANJALI K S	34	55	89	PASS
9	4BW17CS009	ANUPAMA A M	36	51	87	PASS
10	4BW17CS010	ATHIFA FARHEEN N	33	50	83	PASS
11	4BW17CS012	BHAVAN A J	32	50	82	PASS
12	4BW17CS013	BHAVANI N D	36	57	95	PASS
13	4BW17CS014	BHUMIKA M R	34	56	84	FAIL
14	4BW17CS015	BINDU H	39	45	81	PASS
15	4BW17CS016	BRUNDA D	34	27	61	PASS
16	4BW17CS017	CHAITHRA R	34	30	64	PASS
17	4BW17CS018	CHAITHRA JAIN H P	33	28	61	PASS
18	4BW17CS020	DEEKSHITHA C	33	27	60	PASS
19	4BW17CS021	DEEPIKA A N	37	54	91	PASS
20	4BW17CS022	DIVYA KHYANI	35	48	83	PASS
21	4BW17CS023	DIVYASHREE K H	35	48	83	PASS
22	4BW17CS024	HARISH GOWDA	37	48	85	PASS
23	4BW17CS025	HARSHITHA Y	33	34	67	PASS
24	4BW17CS026	HEMA D	36	51	87	PASS
25	4BW17CS027	INDU SHREE G J	33	27	60	PASS
26	4BW17CS028	ISHWARAPPA HAVIN	38	28	66	PASS
27	4BW17CS029	JEEVAN R	38	56	94	PASS
28	4BW17CS031	JINASHREE P	36	52	88	PASS
29	4BW17CS032	KARTHIK K P	37	48	85	PASS
30	4BW17CS033	KARTHIK M RAO	33	50	83	PASS
31	4BW17CS034	LAKSHMIKANTH GOWDA M	36	54	90	PASS
32	4BW17CS035	MAANYA K V	36	57	94	PASS
33	4BW17CS036	MANJUSHREE C S	34	58	92	PASS
34	4BW17CS037	MANOJ S B	33	42	75	PASS
35	4BW17CS038	MEGHANA K	36	57	93	PASS
36	4BW17CS039	MEGHANA M V	33	56	89	PASS
37	4BW17CS040	NAVYASHREE H D	34	58	92	PASS

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28	ABW1703141	INDITHA B	35	56	91	FAIL
29	ABW1703142	INDRA KOTESHA S	20	50	10	PASS
30	ABW1703143	INDRA D I	34	49	10	PASS
31	ABW1703144	INDRA K S	38	58	96	FAIL
32	ABW1703145	INDRA SHREE G	34	54	88	PASS
33	ABW1703146	INDRA SHINDI P	34	40	76	PASS
34	ABW1703147	INDRA K R A L	38	34	55	PASS
35	ABW1703148	INDRETHA K B S	33	24	57	PASS
36	ABW1703149	INDRILE	36	37	65	PASS
37	ABW1703150	INDRESH C S	33	37	60	PASS
38	ABW1703151	INDRASHITAN	37	34	71	PASS
39	ABW1703152	INDRA K R L	38	55	95	PASS
40	ABW1703153	INDRATHA B S	33	24	62	PASS
41	ABW1703154	INDRESH KUMAR KOHANDA	33	45	78	PASS
42	ABW1703155	INDRIT KUMAR JHA	36	58	94	PASS
43	ABW1703156	INDRANIL M	36	52	85	PASS
44	ABW1703157	INDRANA GOVINDA N C	40	56	96	PASS
45	ABW1703158	INDRANAY KUMAR C G	33	47	81	PASS
46	ABW1703159	INDRANREPPA KANDAROGAL	35	56	90	PASS
47	ABW1703160	INDRANIL	38	57	85	PASS
48	ABW1703161	INDRANIL M	33	44	77	PASS
49	ABW1703162	INDRANIL SINGH	35	55	90	PASS
50	ABW1703163	INDRANIL B R	33	41	73	PASS
51	ABW1703164	INDRANIL B L	33	53	85	PASS
52	ABW1703165	INDRANIL RATHA	34	57	85	PASS
53	ABW1703166	INDRANIL	33	24	57	PASS
54	ABW1703167	INDRANIL JAGGULA	33	45	78	PASS
55	ABW1703168	INDRANIL	33	36	68	PASS
56	ABW1703169	INDRANIL B S	33	38	71	PASS
57	ABW1703170	INDRANIL REDDY	33	9	41	FAIL
58	ABW1703171	INDRANIL PASAGAR	33	36	68	PASS

No. of Students Attended	68
No. of Students Absent	NIL
No. of Students Passed	67
No. of Students Failed	1
Pass Percentage	98%

  
**H O D**  
 Dept. of Computer Science & Engg.  
 S.G.T. Institute of Technology  
 B.G. Nagar - 571 448  
 Srinivasnagar Tq. Mandya Dist  
 Karnataka (INDIA)

CO ATTAINMENT				
CO	CIE (60%)	SEE (30%)	CES (10%)	TOTAL
1	3.00	0.87	2.51	2.31
2	3.00	0.87	2.52	2.31
3	3.00	0.87	2.41	2.30
4	3.00	0.87	2.41	2.30

PO / PSO ATTAINMENT															
PO/PSO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO	CO ATTAINMENT														
1	2.31	3	2	2	1									2	
2	2.31	3	2	2	2	1								2	
3	2.30	3	2	2	2									2	
4	2.30	3	2	2										2	
PO# SUM		3	2	2	1.667	1								2	
WEIGHTED SUM		20.78	13.85	13.85	11.54	2.31								13.85	
AVG		1.73	1.15	1.15	1.28	0.77								1.15	
PO#=(SUM/3)/No of PO's mapped(4)															
Target		3	2	2	1.67	1								2	
ATTAINM		1.73	1.15	1.15	1.28	0.77								1.15	0.00

  
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