

10) write a c++ program to implement quicksort

Ans: Source code

```
#include <iostream.h>
#include <conio.h>

void quicksort( int a[20] , int start, int end )
{
    if (start < end)
    {
        int pivotindex = (start+end)/2;
        int pivot = a[pivotindex];
        int i = start;
        int j = end;
        while (i <= j)
        {
            while (a[i] < pivot)
                i++;
            while (a[j] > pivot)
                j--;
            if (i <= j)
            {
                int temp = a[i];
                a[i] = a[j];
                a[j] = temp;
                i++;
                j--;
            }
        }
    }
}
```



```
int temp = a[i];
```

```
a[i] = a[j];
```

```
a[j] = temp;
```

```
i++;
```

~~j++~~ j--;

}

}

```
quicksort(a, start, j);
```

```
quicksort(a, i, end);
```

}

}

```
void main()
```

{

```
int i, a[10], n;
```

cout << "To enter the size of the array : ";

```
cin >> n;
```

cout << "To enter the elements into the array : ";

```
for (i=0; i<n; i++)
```

{

```
cin >> a[i];
```

}

cout << "Elements before quicksort : ";

```
for (i=0; i<n; i++)
```

{

Date:

```
cout << a[i] << " | ";

```

{

```
quicksort(a, 0, n-1);

```

```
cout << " | " << elements << " after quicksort : " << n;

```

```
for(i = 0; i < n; i++)

```

{

```
cout << a[i] << " | ";

```

{

{

Output

enter the size of the array: 5

enter the elements into the array: 4 3 6 0 7 8

elements before quicksort : 4 3 6 0 7 8

elements after quicksort : 0 3 4 6 7 8



11) write a C++ program to implement stack operations using an array?

Ans: Source code

```
#include <iostream.h>
#include <conio.h>
#include <process.h>
void main()
{
    int a[20], top, n, num, choice, i;
    top = -1;
    clrscr();
    cout << "Enter the size of the array : ";
    cin >> n;
    do
    {
        cout << "1.to push 2.pop 3.display 4.exist ";
        cout << "Enter your choice : ";
        cin >> choice;
        switch(choice)
        {
            case 1:
                if (top == n - 1)
```

```
2 cout<< "In stack overflow -- cannot perform push  
operation ";  
else  
{  
    top++;  
    cout<< "To enter the element to be searched Inserted :";  
    cin>>num;  
    a[top]=num;  
    cout<< "In push operation successful ";  
}  
break;  
case 3:  
if (top == -1)  
{  
    cout<< "In stack underflow ---- cannot perform  
pop operation in ";  
}  
else  
{  
    int temp;  
    temp = a[top];  
    cout<< "In element deleted is " << temp;  
    top--;  
}  
break;
```



case 3 :

cout << "Element in the stack are : In ";

for (i = 0; i < top; i++)

{

cout << a[i] << "\t";

}

break;

case 4 :

exit (0);

break;

default :

cout << "In invalid choice In ";

break;

{

} while (choice != 4);

getch();

}

Output

enter the size of the array : 3

Press any

1. Push

2. Pop

3. display

4. exit

Date ..

enter,

enter

push

press

1. pu

2. po

3. di

4. ex

enter

enter

push o

press

" push

1. pu

2. di

3. ex

nter

lement

press

1. pu

2. po

3. di

4. ex

nter

lement

press

1. pu

2. po

3. di

4. ex

nter

lement

enter your choice : 1

enter the element to be inserted : 3

push operation successful.

Press any

1. Push

2. Pop

3. display

4. exit

enter your choice : 1

enter the element to be inserted : 4

push operation successful.

Press any

1. Push

2. Pop

3. display

4. exit

enter your choice : 3

elements in the stack are : 3 4

Press any

1. Push

2. Pop

3. display

4. exit

enter your choice : 2

element deleted is 4

Press any

1. Push

2. Pop

3. display

4. exit

enter your choice : 3

Element in the stack are : 3



Press any

1.push

2.pop

3.display

4.exit

enter your choice : 4

Q) write a C++ program to implement queue operations using an array?

Ans: Source code

```
#include <iostream.h>
#include <conio.h>
#include <process.h>

void main()
{
    int a[20], choice, n, read, front, num;
    clrscr();
    read = -1;
    front = -1;
    cout << "Enter the size of the array : ";
    cin >> n;
    do
    {
        cout << "\n Enter one of these 1. enqueue in Q.
        dequeue in 2. display in 3. exit in ";
        cin >> choice;
        switch (choice)
        {
            case 1:
                if (read == n - 1)
                {
                    cout << "Queue is full ... cannot perform insertion
                    operation ";
                }
        }
    }
}
```



else

{

cout << "In enter the element to be inserted :";

cin >> num;

if (front == -1 && rear == -1)

{

front = 0;

}

rear++;

a[rear] = num;

cout << "In enqueue successfull";

}

break;

Case 2 :

if (front == -1)

{

cout << "No element deleted is " << a[front];

if (front == rear)

{

front = rear = -1;

}

else

{

front++;

}

}

break;

case 3 :

: if (Front == -1)

{

cout << "The queue is empty";

}

else

{

cout << "The elements in the queue are : \n";

for (int i = Front ; i <= Rear ; i++)

{

cout << a[i] << " ";

}

}

break;

case 4 :

exit(0);

break;

default :

cout << "An invalid choice";

break;

}

} while (choice != 4);

getch();

}

Output

enter the size of the array : 4

enter one of these

1. enqueue

2. dequeue

3. display

4. exit

enter your choice : 1

enter the element to be inserted : 34

enqueue successful.

enter one of these

1. enqueue

2. dequeue

3. display

4. exit

enter your choice : 1

enter the element to be inserted : 45

enqueue successful.

enter one of these

1. enqueue

2. dequeue

3. display

4. exit

enter your choice : 3

Elements in the queue are :

34 45

Date :

enter one of these

1. enqueue

2. Dequeue

3. display

4. exit

enter your choice : 2

element deleted is 34

enter one of these

1. enqueue

2. Dequeue

3. display

4. exit

enter your choice : 3

elements in the queue are :

45

enter one of these

1. enqueue

2. Dequeue

3. display

4. exit

enter your choice : 4

18) write a C++ program to implement circular queue using an array?

Ans: source code

```
#include <iostream.h>
#include <conio.h>
#include <process.h>

void main()
{
    int choice, a[20], n, read, front, num;
    clrscr();
    read = -1;
    front = -1;
    cout << "In enter the size of the array : ";
    cin >> n;
    do {
        cout << "In enter your choice In 1. enqueue In 2. dequeue In
3. display In 4. exit In ";
        cout << "In enter your choice : ";
        cin >> choice;
        switch (choice)
        {
            case 1:
                if (front == (read + 1) * n)

```

Date:

```

    {
        cout << "In queue is full ... cannot perform insertion
        operation ";
    }

    else
    {
        cout << "In enter the element into the queue : ";
        cin >> num;
        if (front == -1)
        {
            front = 0;
        }
        rear = (rear + 1) % n;
        a[rear] = num;
        break;
    }

    case 2 :
    if (front == -1)
    {
        cout << "In queue is empty -- cannot perform
        deletion operation ";
    }
    else
    {
        num = a[front];
        if (front == rear)
        {
            front = rear = -1;
        }
    }
}

```



```
else
{
    front = (front + 1) % n;
    cout << "The deleted element is " << arr[front];
}

break;

case 3 :
    if (front == -1)
{
    cout << "The queue is empty";
}

else
{
    cout << "The elements in the queue are : ";
    int i = front;
    do
    {
        cout << arr[i] << " ";
        i = (i + 1) % n;
    } while (i != (rear + 1) % n);
}

break;

case 4 :
    exit(0);
default :
```

Date:

```
cout << "In invalid option";
```

```
3
```

```
while (choice != 4);
```

```
getch();
```

```
3
```

Output

enter the size of the array: 2

enter my choice:

1. enqueue

2. dequeue

3. display

4. exit

enter your choice: 1

enter the element to be the queue: 34

enter
choose my choice

1. enqueue

2. dequeue

3. display

4. exit.

enter your choice: 1

enter the element into the queue: 45

enter my choice:

1. enqueue

2. dequeue

3. display

4. exit



```
enter your choice : 3
elements in the queue are :
84 45
enter any choice
1. enqueue
2. Dequeue
3. Display
4. exit .
enter your choice : 2
deleted element is 34
either one of these
1. enqueue
2. Dequeue
3. display
4. exit
enter your choice : 3
elements in the queue are :
45
enter any choice
1. enqueue
2. Dequeue
3. display
4. exit
enter your choice : 1
enter the element into the queue : 96
exit
def
```

Date :

Page No:

enter one of these :

- 1. enque
- 2. deenue
- 3. display
- 4. exit

enter your choice : 3

elements in the queue are

45 55

enter any choice

- 1. enque
- 2. deenue
- 3. display
- 4. exit

enter your choice : 4

a) write a program to perform postFix evaluation

Ans: Source code

```
#include <iostream.h>
#include <conio.h>
#include <math.h>
#include <string.h>

void main()
{
    string postFix;
    char c;
    int stack[20], i, top=0;
    clrscr();
    cout<<"To enter the postFix expression : ";
    cin>>postFix;
    for(i=0; i< postFix.length(); i++)
    {
        switch (postFix[i])
        {
            case '+':
                stack[top] = stack[top-1] + stack[top];
                top--;
                break;
            case '-':
                stack[top-1] = stack[top-1] - stack[top];
                top--;
        }
    }
}
```

Date :

```

break;
case '+':
stack[top-1] = stack[top-1] + stack[top];
top--;
break;
case '^':
stack[top-1] = pow(stack[top-1], stack[top]);
top--;
break;
case '*':
stack[top-1] = stack[top-1] * stack[top];
top--;
break;
default:
top++;
stack[top] = postfix[i] - '0';
}
}

```

cout << "In result is : " << stack[top];

getch();

Output

enter the post fix operation : 23+45+*6 /

Result is : 9



Date:

15) program to convert infix to postfix conversion

Ans: Source code

```
#include <iostream.h>
#include <conio.h>
#include <cctype.h>
#include <process.h>

char stack[20];
int top = -1;

void push(char x)
{
    top++;
    stack[top] = x;
}

char pop()
{
    if (top == -1)
        return -1;
    else
        return (stack[top--]);
}

int priority(char x)
{
    if (x == '(')
        return 0;
```

Date:

```

else if (x == '+' || x == '-')
    return 1;
else if (x == '*' || x == '/')
    return 2;
else if (x == '^')
    return 3;
else
    return -1;
}

int main()
{
    char exp[20], *e, item;
    clrscr();
    cout << "In Infix to Postfix ";
    cout << "In enter the infix expression: ";
    cin >> exp;
    e = exp;
    while (*e != '\0')

    {
        if (isnum(*e))
            cout << *e;
        else if (*e == '(')
            push(*e);
        else if (*e == ')')
            {
                while (stack[toptop] != '(')

```



```

    {
        item = pop();
        cout << item;
    }
    else
    {
        if (priority(stack[top]) >= priority(*e))
            cout << pop();
        push (*e);
    }
    e++;
}
while (top != -1)
{
    cout << pop();
    getch();
}

```

Output

Infix to Postfix.

Enter the infix expression : (a+b)*c-d/e
~~ab+c*d/e -~~