

Data Structures

SYBTech(CSE)

Unit – 1

Introduction

PPT-6

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Unit 1 [6 hrs]

Introduction:

Data,

Data types,

Data structure,

Abstract Data Type (ADT),

Representation of Information,

Characteristics of algorithm,

Program,

Analyzing programs.

Objective

**Be familiar with analysis of Algorithm
(Time Complexity).**

Ex: Matrix Addition

Algo Add(a, b, c, m, n)

{

for i:=1 to m step 1 do

for j:= 1 to n step 1 do

c[i, j]:=a[i, j]+b[i, j];

}

Algo Add(a, b, c, m, n)

```
{  
    for i:=1 to m step 1 do  
    {  
        count:=count +1;  
        for j:= 1 to n step 1 do  
        {  
            count:=count +1;  
            c[i, j]:=a[i, j]+b[i, j];  
            count:=count +1;  
        }  
        count:=count +1;  
    }  
    count:=count +1;  
}
```

Algo Add(a, b, c, m, n)

{

for i:=1 to m step 1 do

{

count:=count +2;

// 2m

for j:= 1 to n step 1 do

count:=count +2;

//2mn

}

count:=count +1;

// 1

}

Count: = 2mn + 2m + 1

2. Build a Table:

Sr.

No.	Statement	S/E	Frequency	Total
1	Algo Sum (a,n)	0	0	0
2	{	0	0	0
3	s:= 0.0	1	1	1
4	for i:= 1 to n do	1	n+1	n+1
5	s:= s + a[i]	1	n	n
6	return s;	1	1	1
7	}	0	0	0
				Total: 2n+3

Ex:

S.N.	Statement	S/E	Frequency		Total	
			n=0	n>0	n=0	n>0
1	Algo RSum (a,n)	0	0	0	0	0
2	{	0	0	0	0	0
3	if (n<=0) then	1	1	1	1	1
4	return 0.0;	1	1	0	1	0
5	Else return					
	a[n]+RSum(a,n-1);	1	0	1+x	0	1+x
6	}	0	0	0	0	0
Total Steps:					2	2+x

x=tRSum(n-1)

Total Step Count = 2 ; n=0
= 2 + tRSum(n-1) ; n>0

S. N.	Statement	S/E	Freq	Total
1	void Add(a,b,c,m,n)	0	0	0
2	{	0	0	0
3	For i:=1 to m step 1 do	1	m+1	m+1
4	For j:= 1 to n step 1 do	1	m(n+1)	mn+m
5	c[i,j]:=a[i,j]+b[i,j];	1	mn	mn
6	}	0	0	0
				Total:2mn+2m+1