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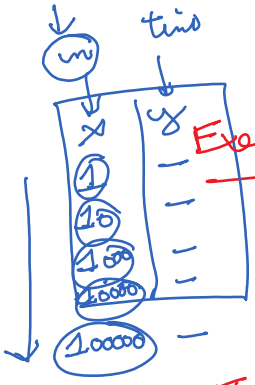
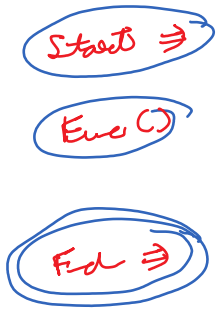
Time complexity

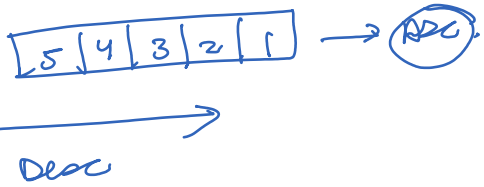


Execution Method

Time complexity (Running time)



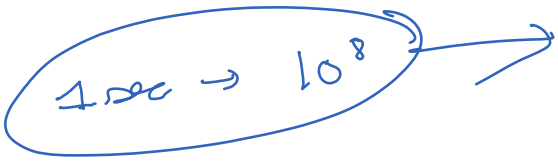
Time = End − Start



$10^6 \longrightarrow O(n^2)$

$(10^6)^2 = 10^{12} = 10^4 \times 10^8$

$= 10^4$ sec $=$ 166 minutes



Space complexity

Aux → Auxiliary

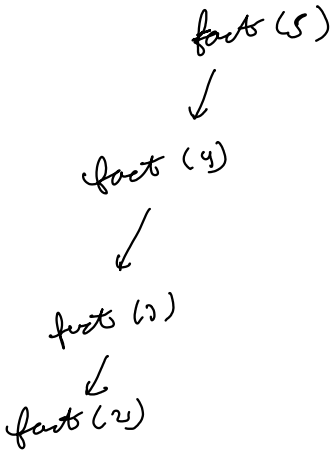
O(n)

1) Auxiliary Memory → ✗

2) At a particular moment, what is the max. memory used?

// Body

fact(n-1);



(n-1) K + C

$f(n) = Kn - K + C$

$\in O(n)$

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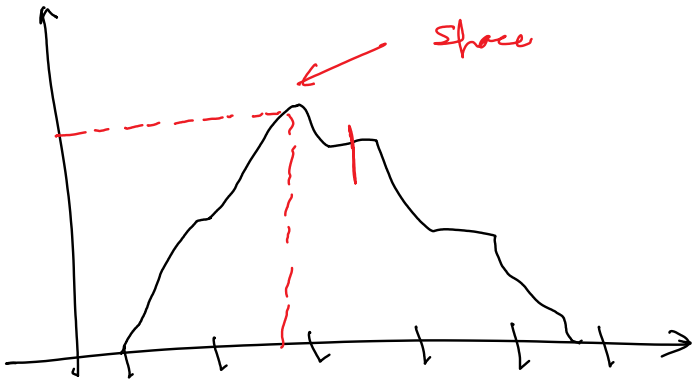
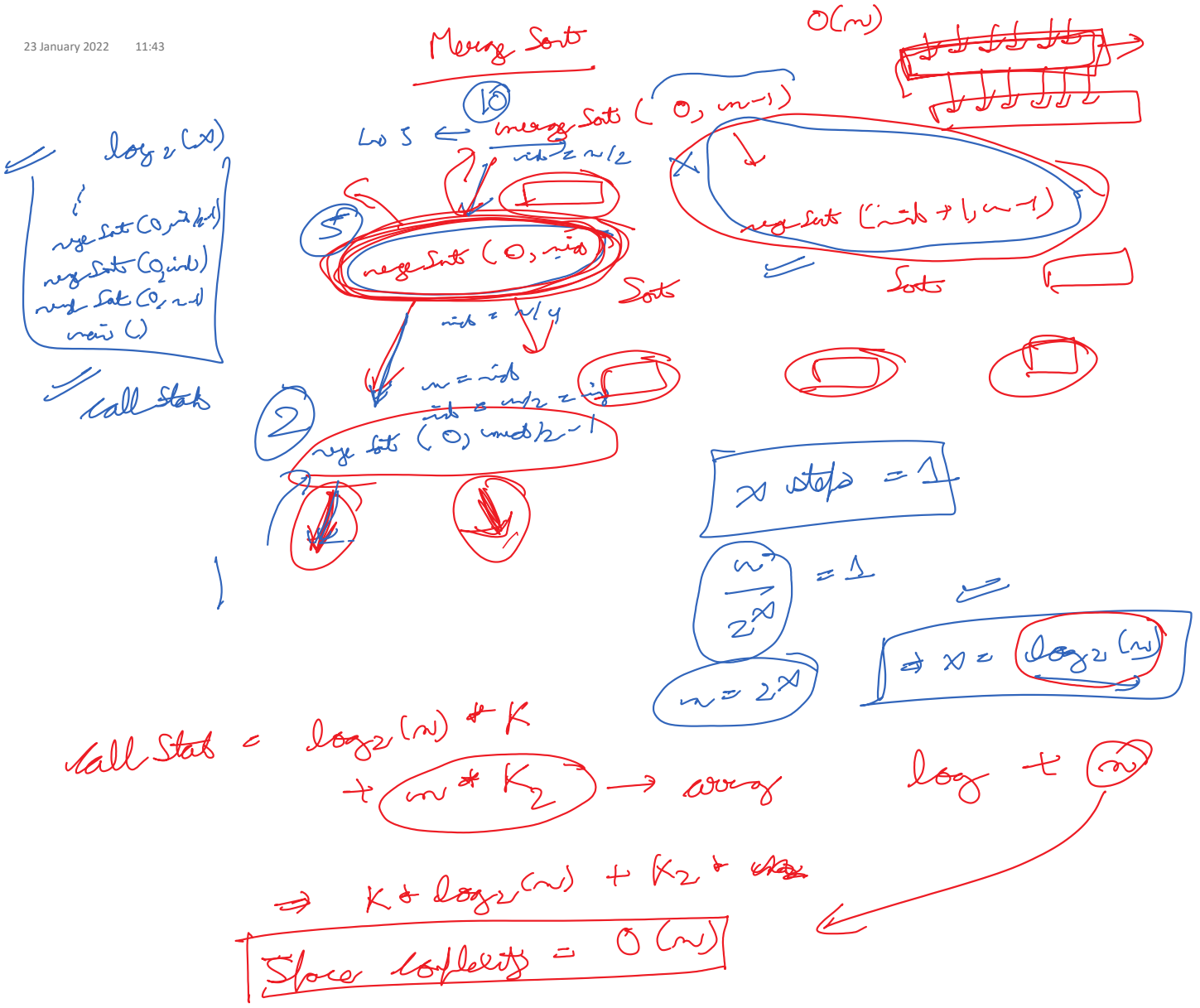
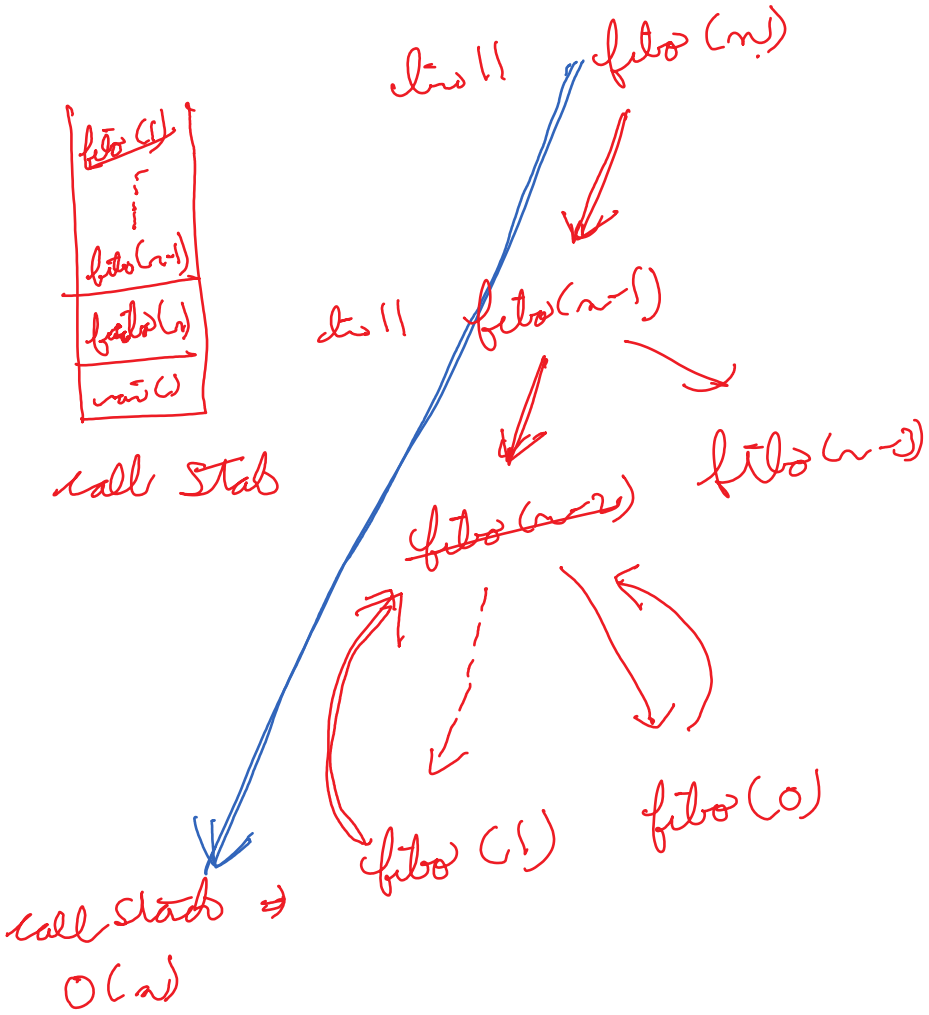


{

int arr[3];

}


Merge Sort
O(n)
log2(n)
call Stack
Sorts
Sorts
n stop = 1
n = 2^x
x = log2(n)
call Stack = log2(n) * K
+ n * K2 → array
log + n
⇒ K * log2(n) + K2 * n
Space Complexity = O(n)



$F(n) = n * K + C$

O(n) → Space Complexity

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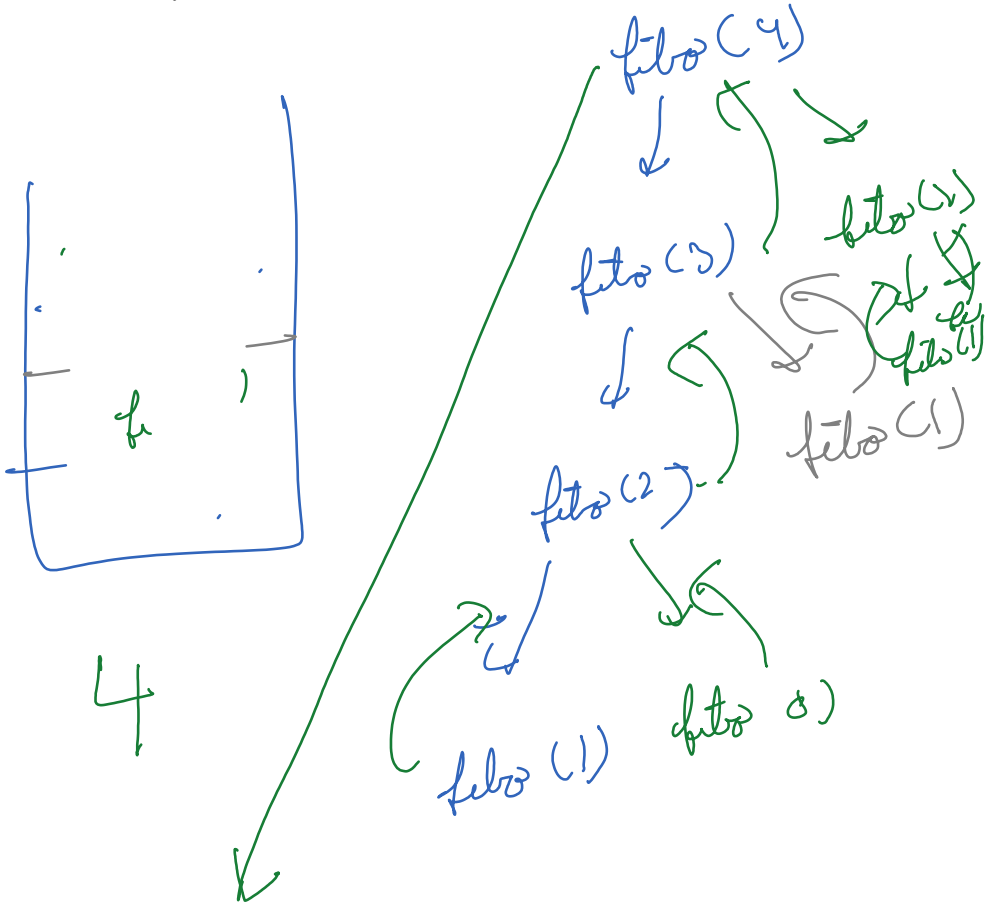

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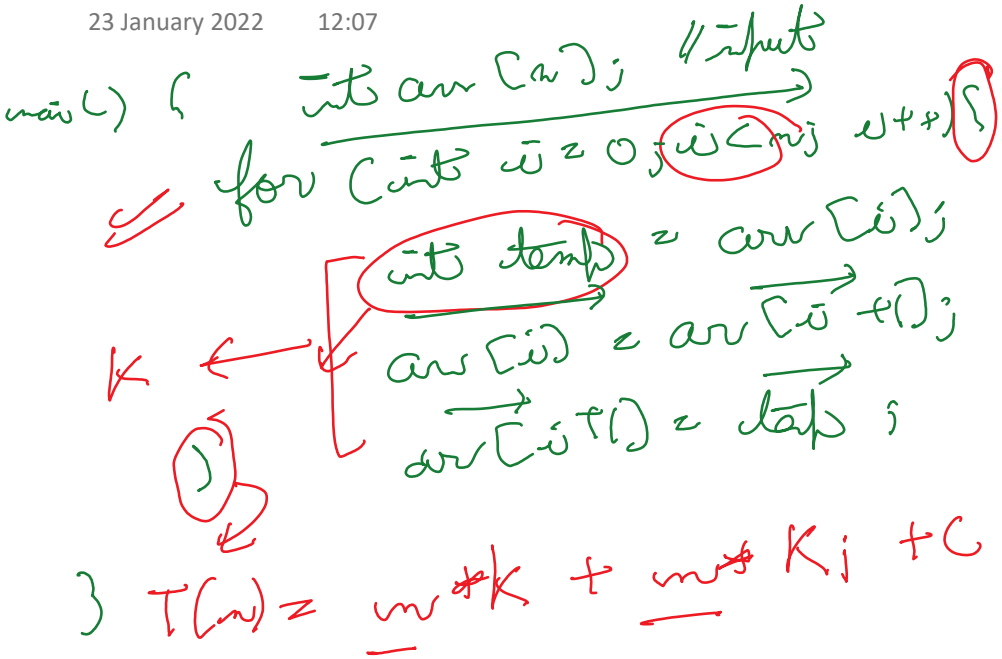
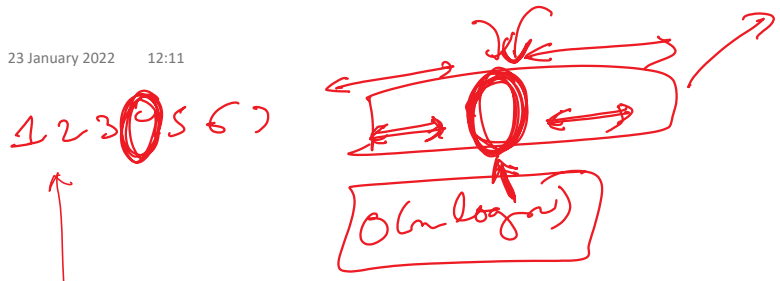


$T(n) = n*k + n*k_j + c$

Time complexity : $O(n)$

Space complexity : $O(1)$

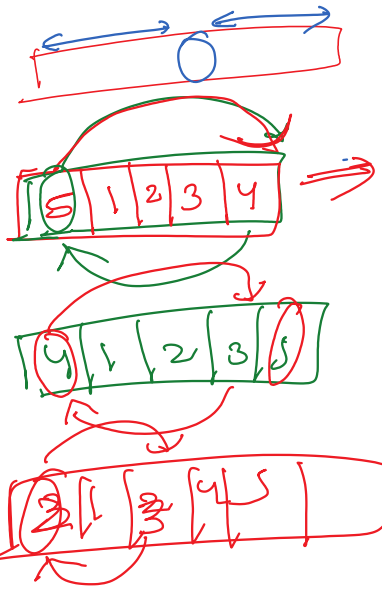
$O(c) = O(1)$



Quick Sort

Quick Sort
↓
By Intuition
around median

pivot → arr[0]



func(0, n) ⟹ O(n)

func(0, n-1) ⟹ O(n-1)

func(0, n-2) ⟹ O(n-2)

func(0, n-3) → O(n)

func(n, 1) → 1

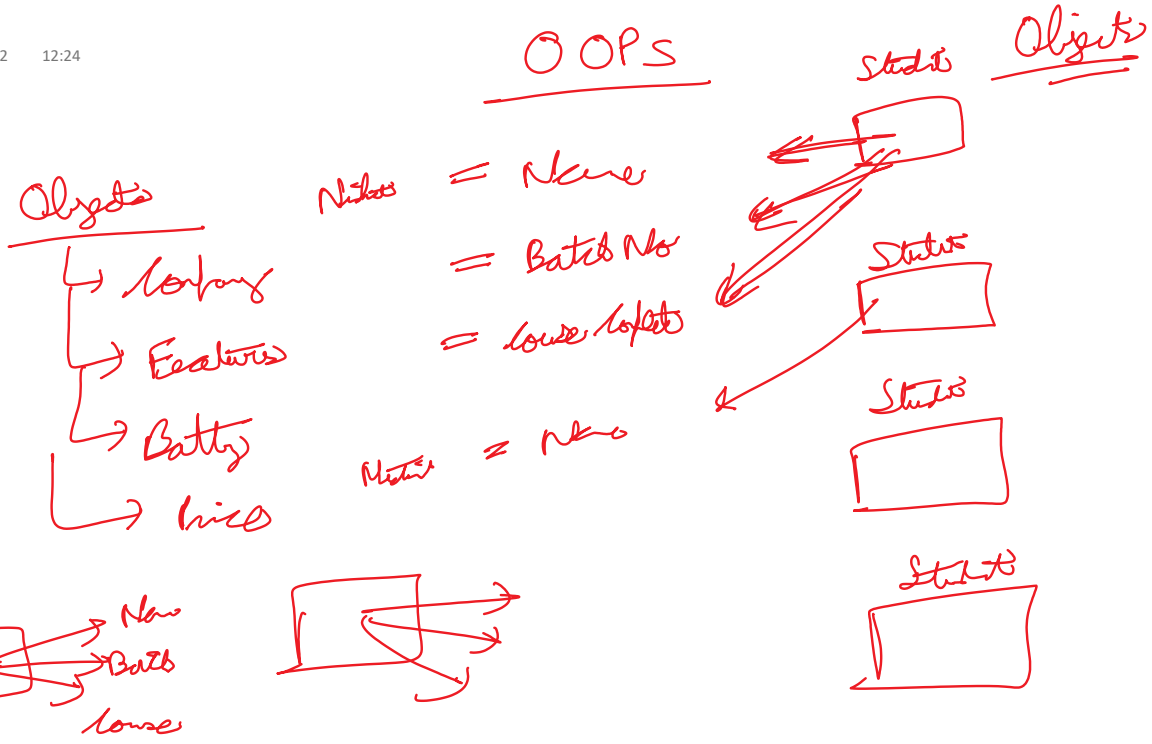
(n-1) * K * O(n)

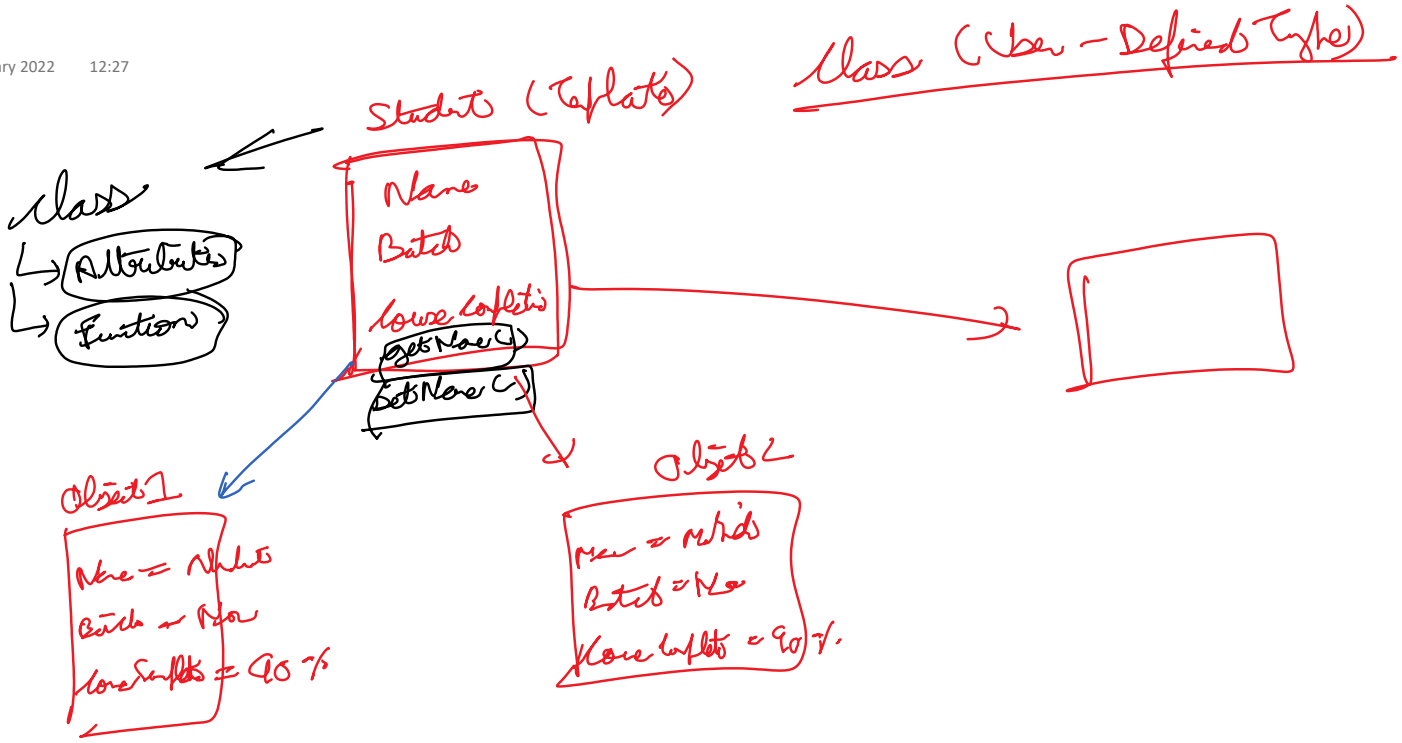
1 + 2 + 3 + --- + n

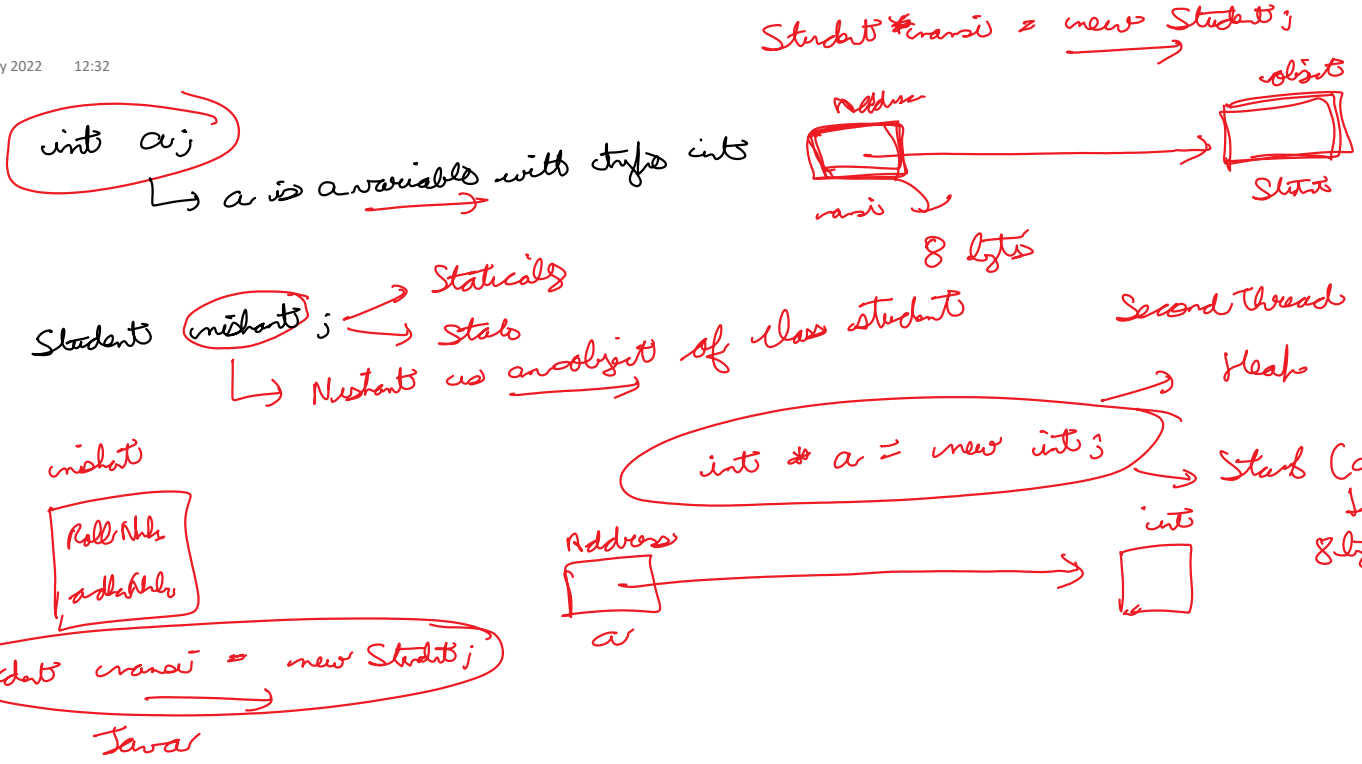
$\Rightarrow \frac{n * (n+1)}{2} = \frac{n^2}{2} + \frac{n}{2}$

$\Rightarrow O(n^2)$

OOPs


Objects
Name = None
= Batch No
= Loan Details
Features
Battery
Price
Name
Batch
Loan
Student
Student
Student
Student
Objects


Class (User - Defined Type)
Student (Template)
Class
Attributes
Function
Name
Batch
Course Completed
getName()
setName()
Object 1
Name = Nikhil
Batch = Nov
CourseCompleted = 90 %
Object 2
Name = Rahul
Batch = Nov
CourseCompleted = 90 %


Student *ranai = new Student;
int a;
a is a variable with type int
Address
object
ranai
Static
8 bytes
Student
main
j
Statically
Static
Main is an object of class student
Second thread
Heap
int * a = new int;
Stack (a)
8 bytes
int
Address
a
main
Roll No.
address
Student ranai = new Student;
Java

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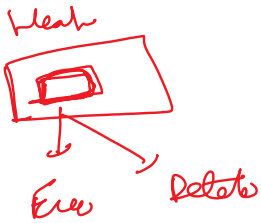


[Class

Access Modifier

→ Private → Class Ke function
→ Public → Kisi Ko access chahiye
→ Protected

}) →

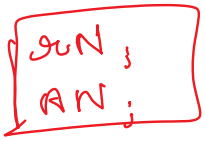
Stack → Free

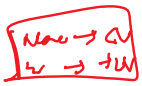
a = 40;

780
GV
a

mishanti = 40;

Student





mishanti.rollNumber = 40;

mishanti.aadharNbr = 50;

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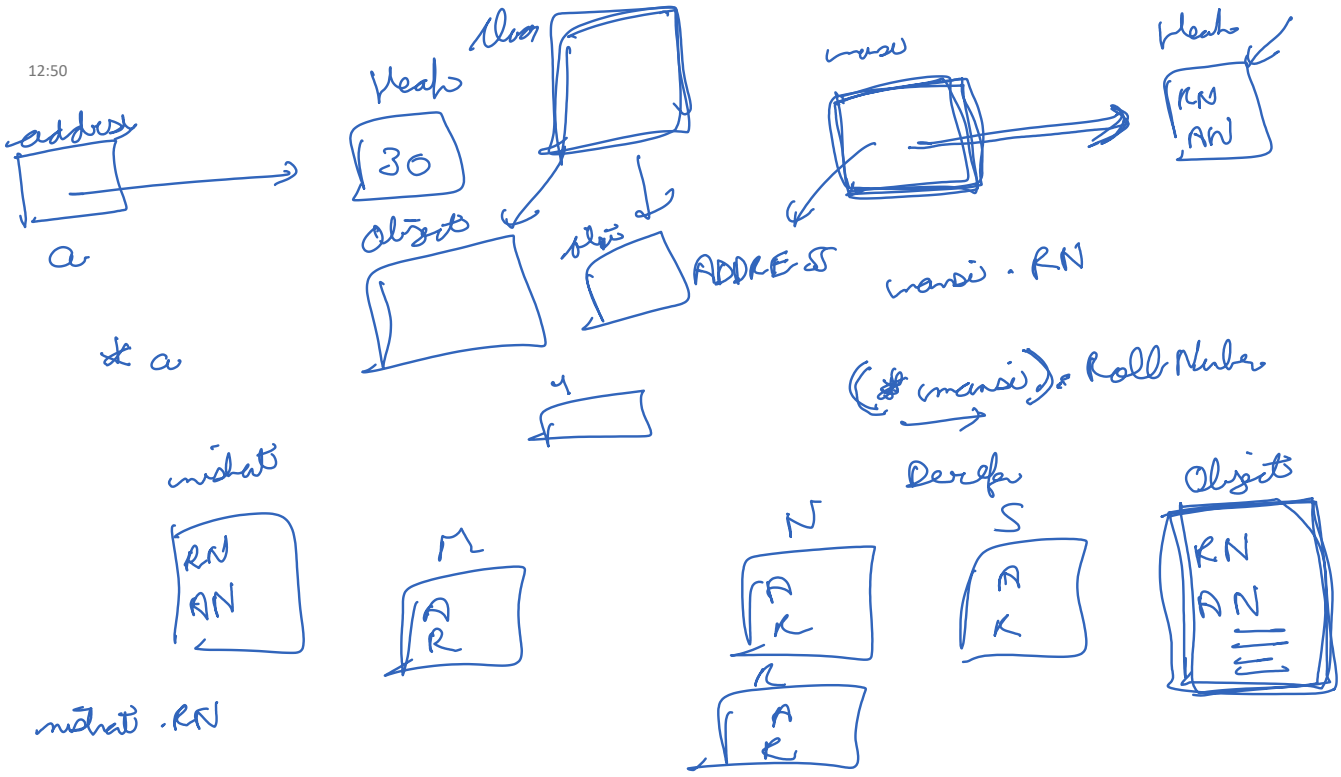
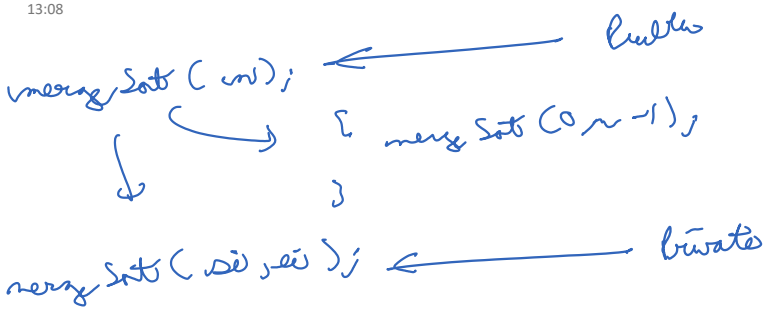


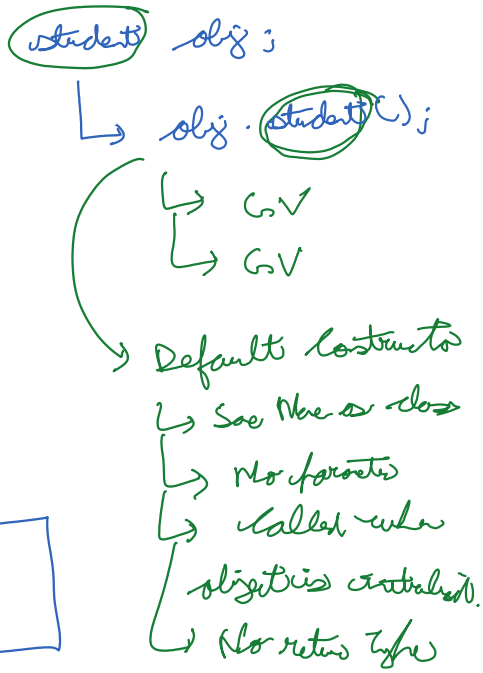

mergeSort(arr);
public
{ mergeSort(0,n-1);
}
mergeSort(int,int);
private

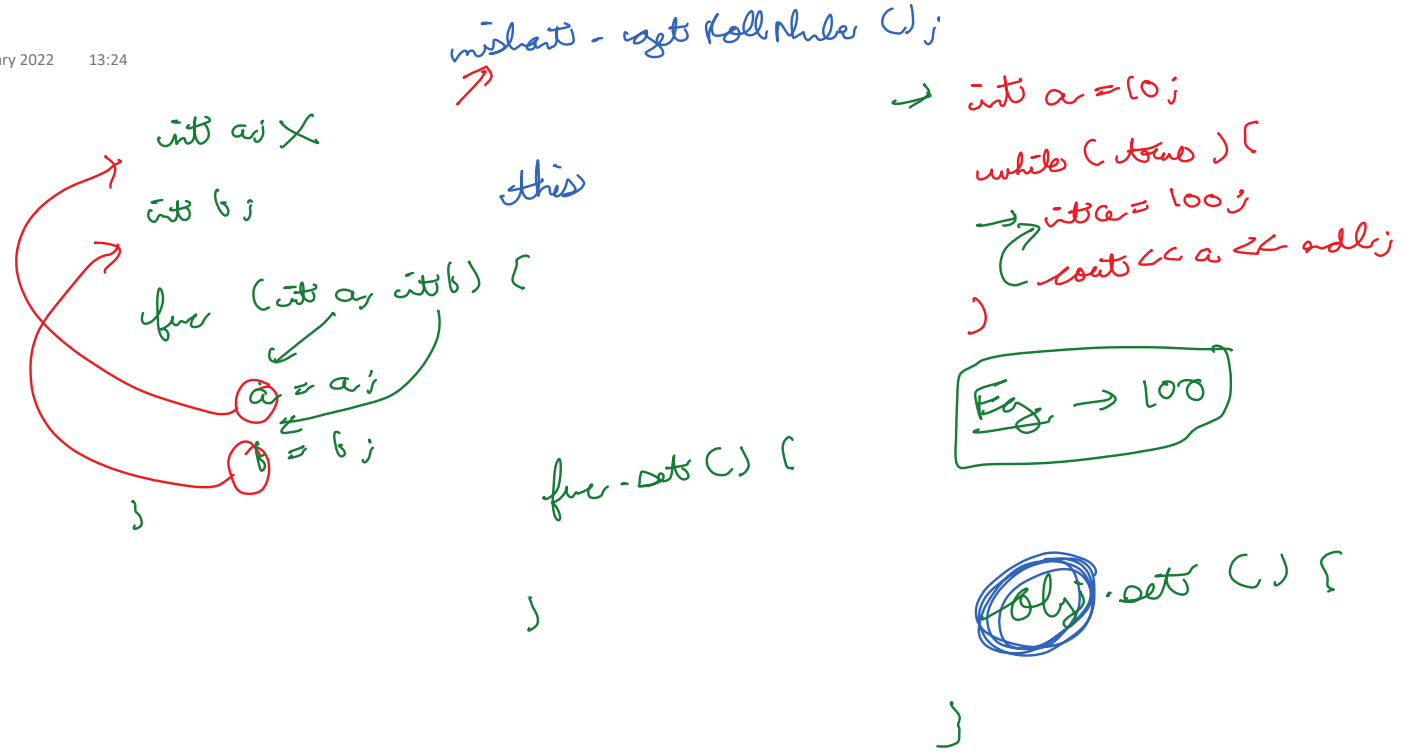
a

obj


780
GV

GV
GV


student obj;
obj.student();
GV
GV
Default Constructor
See Name of class
No parameter
Called when
objects created
No return type


int a; X
int b;
fun (int a, int b) {
a = a;
b = b;
}
this
fun.set() {
}
int a = 10;
while (true) {
int a = 100;
cout << a << endl;
}
Eg → 100
obj.set() {
}

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this

cout << this->name;

```
func() {
    this;   cout << this->name;
}

func() {

}

func() {

}
```

~ Student ( ) {

}

① See None

② Whn use delete / Scope end

③ No parameters

④ Destructor → 1.

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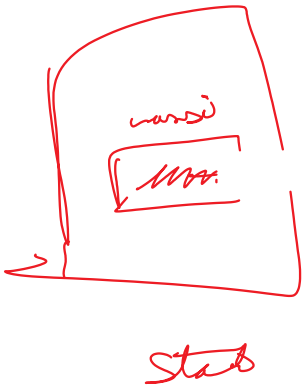

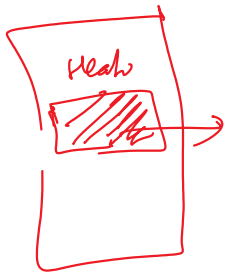

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