CS & IT ENGINEERING

Programming in C

Functions & Storage Classes

Lec - 03

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TOPICS TO
BE
COVERED
Storage Classes

storage class

① scope : part of program in which a variable is visible.
section of code in which a var. can be accessed directly.

② Lifetime : duration → alive

③ storage area : Where a variable is stored.

④ Default value : If we don't initialize.
What is the value.

we did not initialize

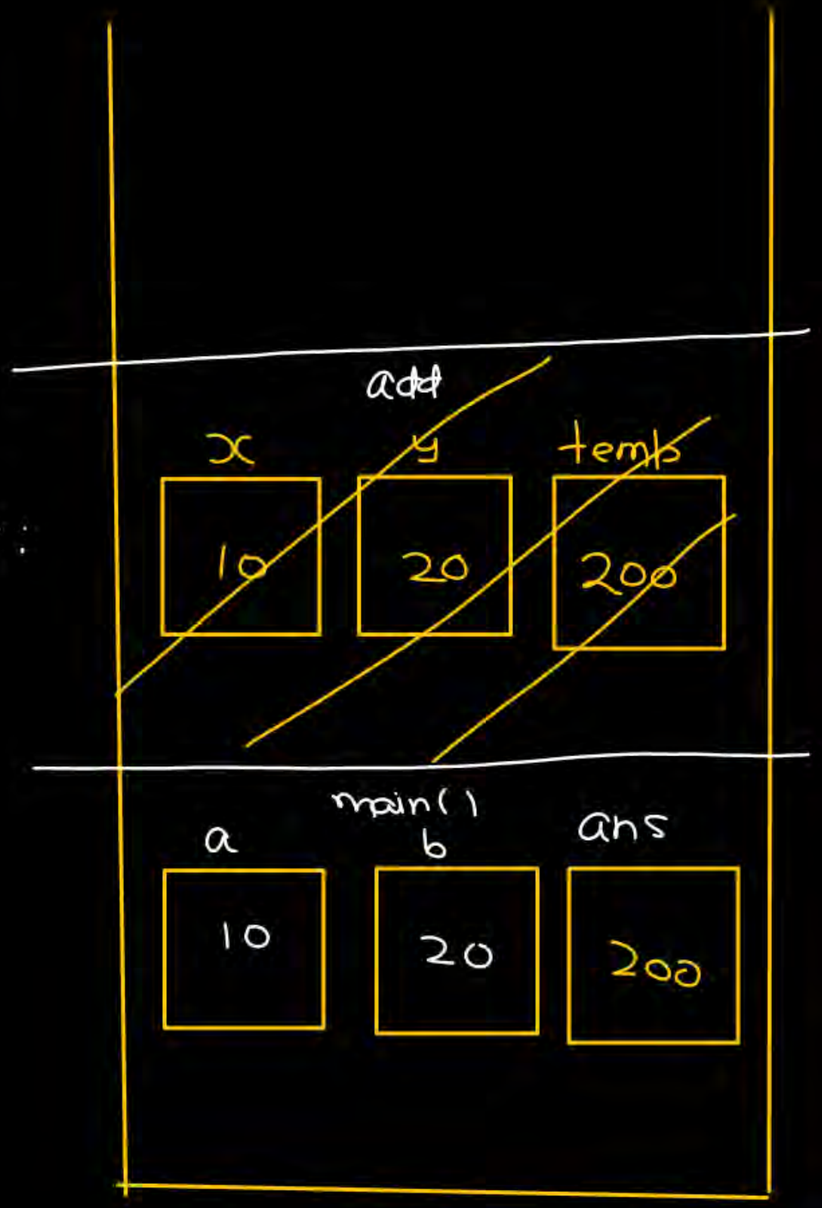
```
#include<stdio.h>
void main(){
    int a;
    printf("%d",a);
}
```

Garbage

1) auto
2) register
3) static
4) extern

auto

```c
#include<stdio.h>
int add(int, int);
void main(){
    int a=10, b=20, ans;
    ans = add(a,b);
    printf("%d", ans);
}
```



formal

```c
int add(int x, int y)
{
    int temp;
    temp = x * y;
    return temp;
}
```

local

1: block scope

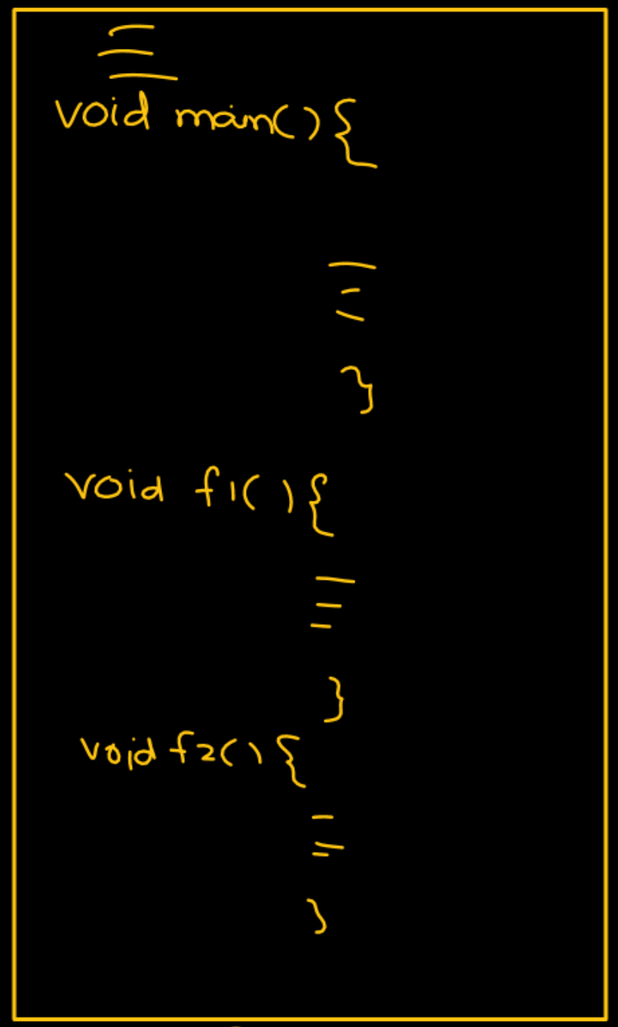
start of block →

{

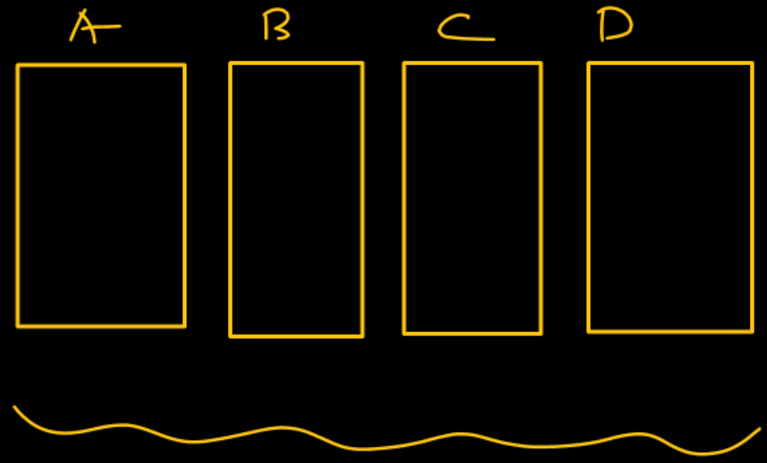
End of block →

}

3: File

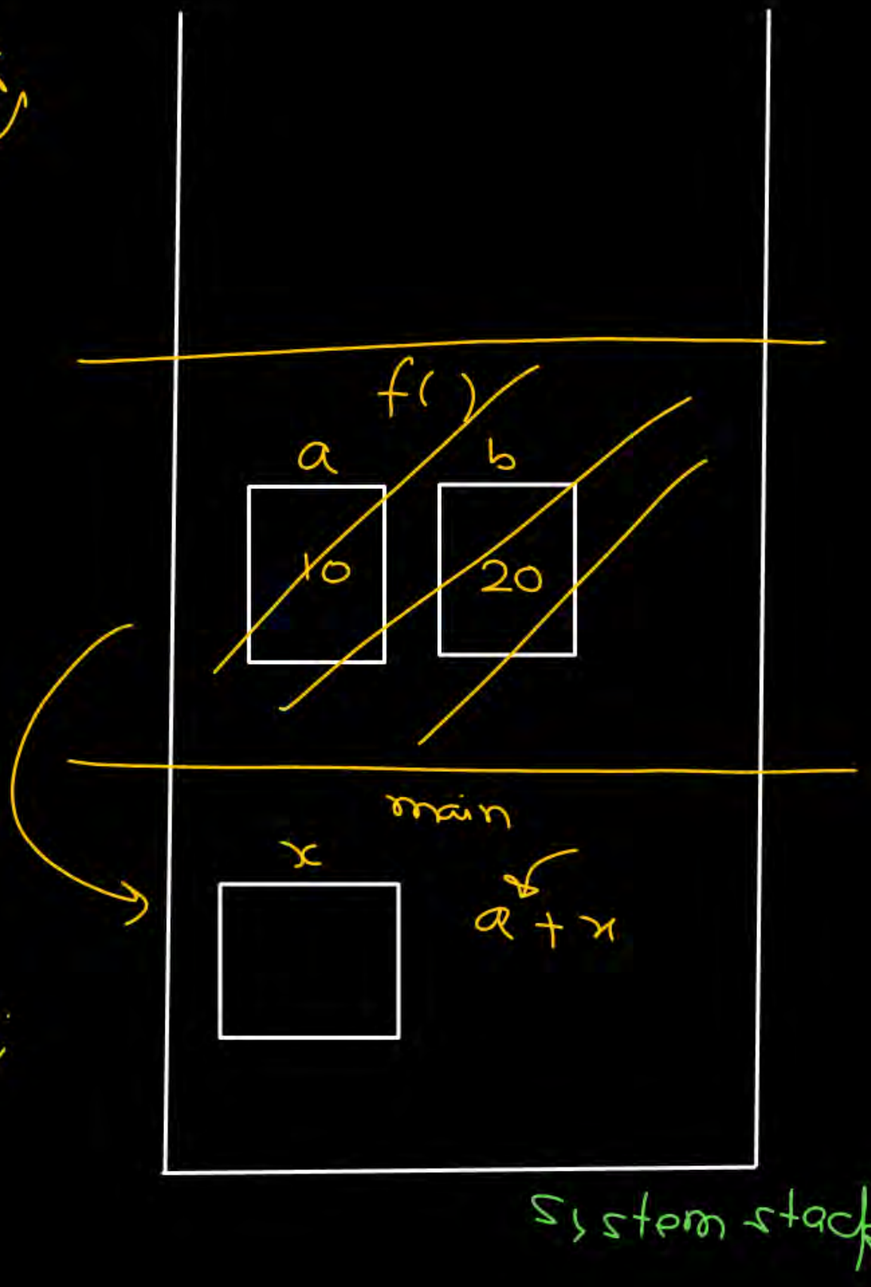


3: Multi-File



```
#include<stdio.h>
void f(){
    int a=10,b=20;
    printf("%d",a+b);
}
void main(){
    int x=10;
    f();
    printf("%d",a+x);
}
```

Error



Compilation

30

auto

1) By default, variable declared inside a function are auto variable.

```
void f(){
    int a;
    ==
    ==
}
```

auto

```
void f(){
    auto int a;
    ==
    ==
}
```

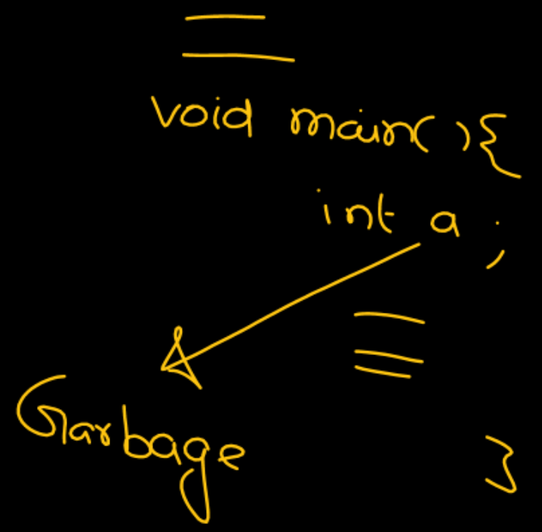
auto

1) scope : block in which they are declared.

2) Lifetime : block in which they are declared.

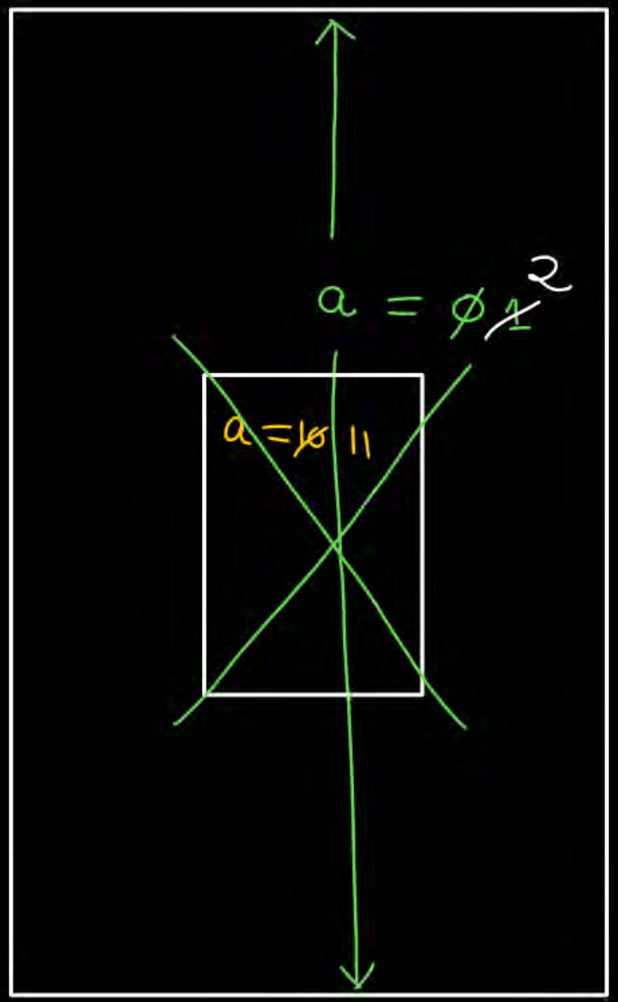
3) Default value : Garbage

4) storage area : stack



```
void main(){
    int a =0;
    ++a;
    printf("%d",a);
    {
        int a = 10;
        ++a;
        printf("%d",a);
    }
    ++a;
    printf("%d",a);
}
```

New scope



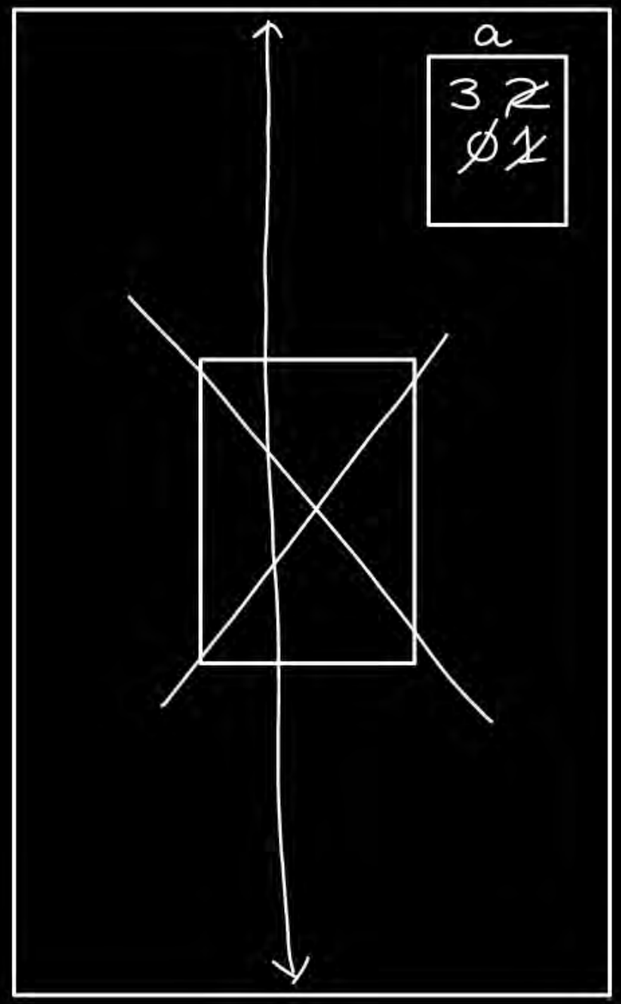
1 11 2

① main scope variable can be accessed to sub-scope.

```
void main(){
    int a =0 ;
     ++a ;
    printf("%d",a);
        {
    ++a ;
    printf("%d",a);
        }
    ++a ;
    printf("%d",a);
    }
```

MAIN Scope

Sub-scope

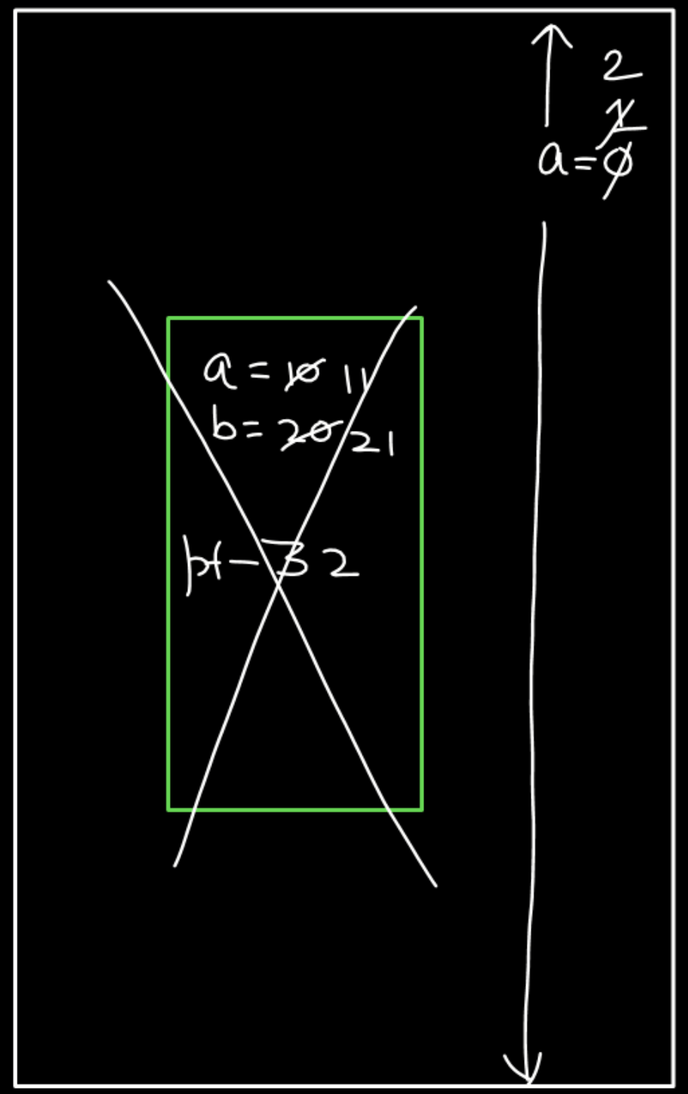


1 2 3

(2) Sub-scope var. are not accessible to main scope.

```
void main(){
    int a=0;
    ++a;
    {
        int a=10,b=20;
        ++a;
        ++b;
        pf("%d",a+b);
    }
    ++a;
    pf("%d",a+b);
}
```

Error

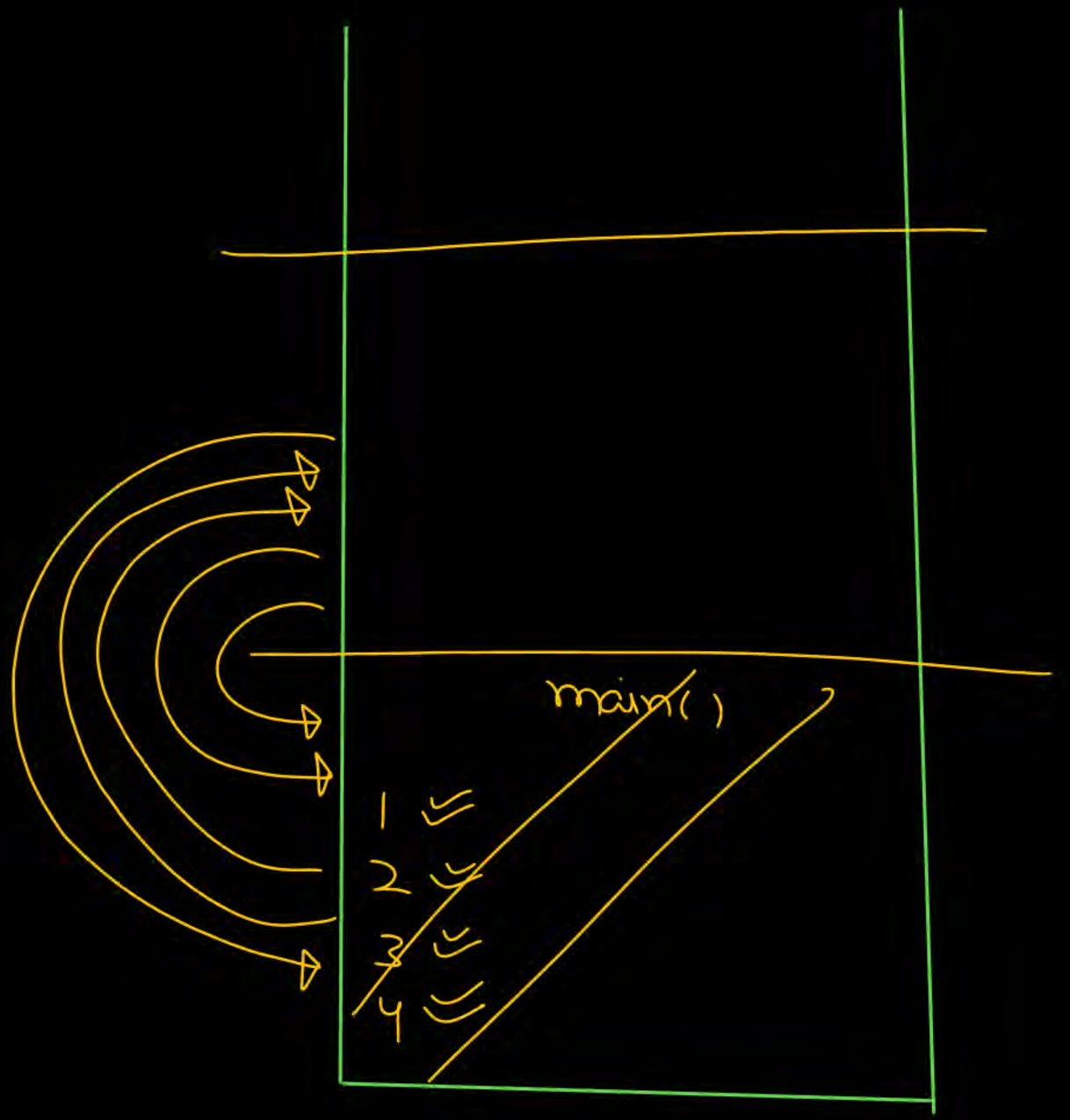


1.) main scope var. are accessible to sub-scope.

2.) sub-scope var. are not accessible to main-scope.

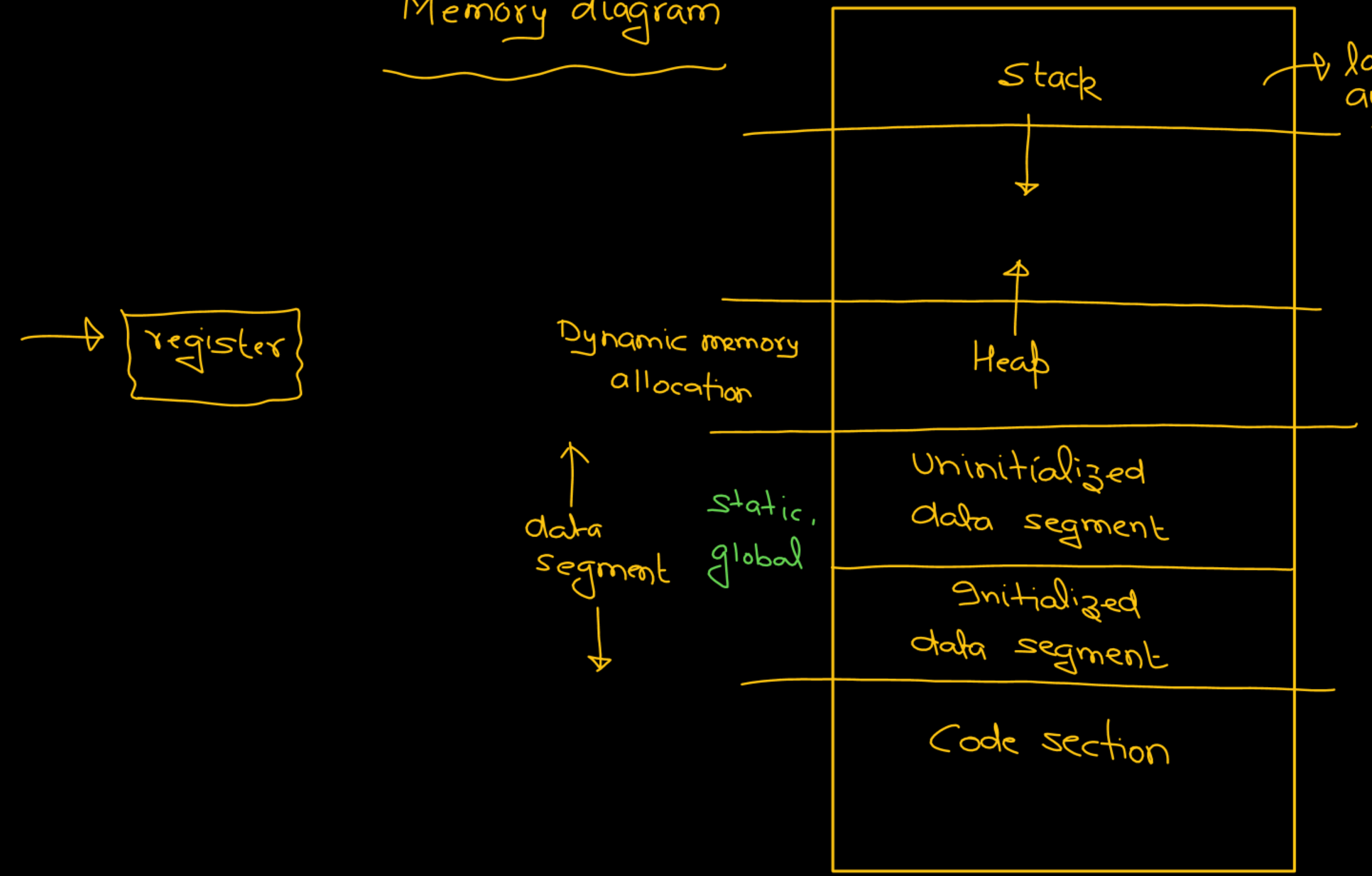
3.) Auto variables are created automatically when we enter the block in which they are declared and destructed automatically when we exit the block.

```
#include<stdio.h>
void f(){
    int a=0;
    ++a;
    pf("%d",a);
    }
void main(){
1   f();
2   f();
3   f();
4       }
```



Memory diagram

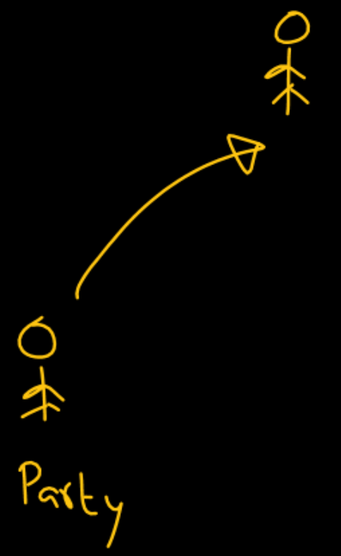
CPU → register

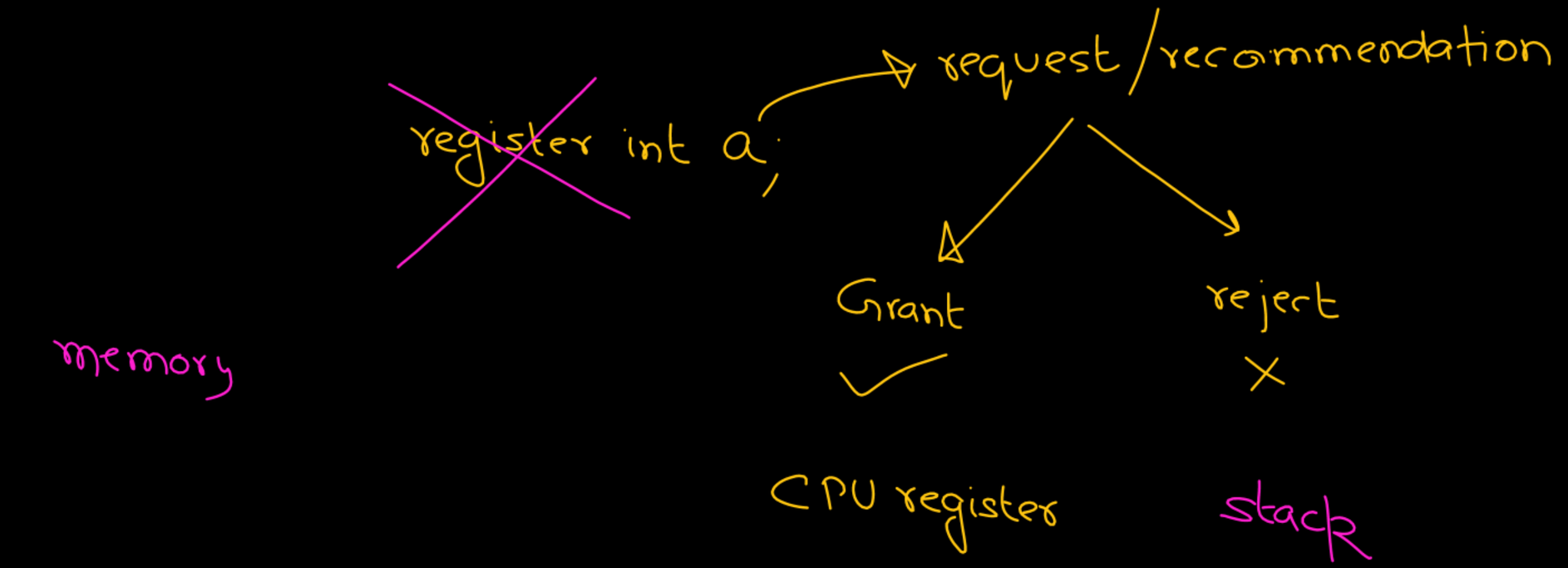


register

* same as auto variable.

* storage area : CPU register / stack.




register int a;
request / recommendation
Grant
reject
memory
CPU register
stack


THANK YOU GW
SOLDIERS !