CS & IT ENGINEERING

C Programming

Miscellaneous

(In One Shot)

By- Pankaj Sharma Sir

TOPICS TO BE COVERED

- Scoping || Comma Operators

Comma Operator

① It works as a seperator

```
int x=10, y=20, z=30;
```

OR

```
{
  int x=10;
  int y=20;
  int z=30;
}
```

Exp →

② It works an an operator

$$a = \underbrace{(\overset{\text{Exp}}{\cancel{10}}, \cancel{20}, 30)}_{};$$

$$\boxed{a = 30}$$

$$Var = (\cancel{Exp1}, \cancel{Exp2}, \cancel{Exp3}, \dots \boxed{Expn});$$

All these exp. are evaluated from left to right and the final value of is the rightmost exp. value.

Exp. are eval. and simply rejected/discarded.

6

13

```
int i;
i = ( printf("Pankaj"), 10+3);
pf("%d", i);
```

```
Pankaj13
```

```
int i=1, j;
j = (i = i+2, ++i, i+3);      (7)
                               4+3
pf("%d %d", i, j);   4 7
```

seq. point

i $\boxed{\cancel{1}\ \cancel{3}\ 4}$

③ Comma ⇒ least priority operator

a = 3, 4, 5 ;

this Exp contains

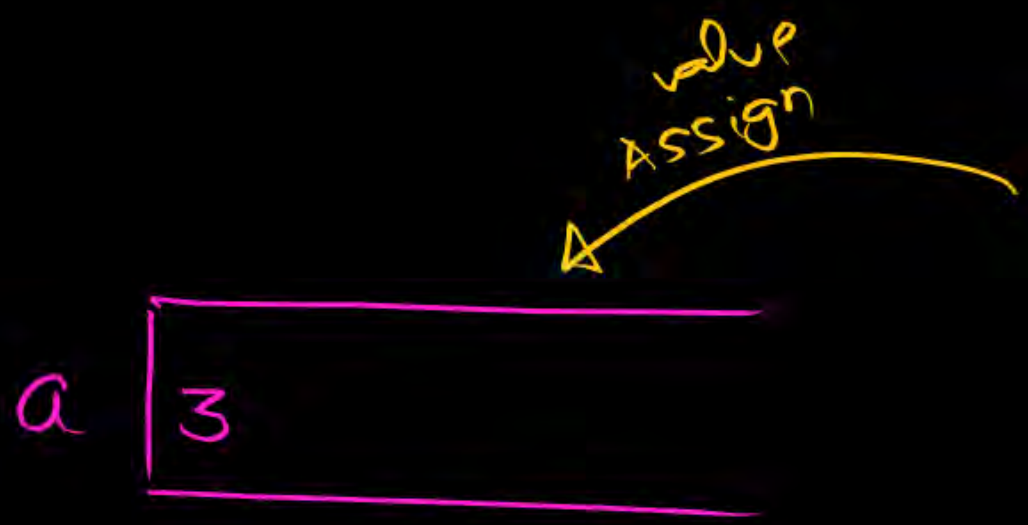
$$\begin{tikzcd} & = \\ \text{contains} \arrow[ur] \arrow[dr] & \\ & , \end{tikzcd}$$

⇓

① (a = 3), 4, 5 ;

↓

3, 4, 5 ;



priority का मतलब

a = (3, 4, 5); — ①

x = 3, 4, 5; — ②

Union

* user defined data type

* union is the keyword used to create user defined data type.

```
struct my{
    char i ;
    int j ;
    };
```

```
union Pankaj {
    char i ;
    int j ;
    };
```

1. In case of structure, all members get individual memory space but all members of a union var. share a comm. memory area.

```
char - 1  ]
int  - 4  ] assume.
float - 8 ]
```

max(1,4) = $\boxed{4}$

```
struct A{                          union B{
    char i;   -> 1                     char i;   -> 1
    int j;    -> 4                     int j;    -> 4
  };                                 };
void main(){                       void main(){
    struct A a;                        union B b;
    pf("%d", sizeof(a));  -> (5)       pf("%d", sizeof(b));
                                   }
```

```
union my{
      char i ;    1
      int j ;     4
      float k ;   8
   };
void main() {
      union my a ;
      pf("%d", sizeof(a)) ;
         =
         =
      }
```

$\rightarrow \max(1,4,8) \Rightarrow \boxed{8}$

```
union my{
      char i ;     1
      int j ;      4
      float k ;    8
      };

void main( ) {
      union my a ;
      pf("%d", sizeof(a));
         a.k = 8.14;

      }
```

largest member का size of

$\max(1,4,8) \Rightarrow \boxed{8}$

Type pruning

L.L.

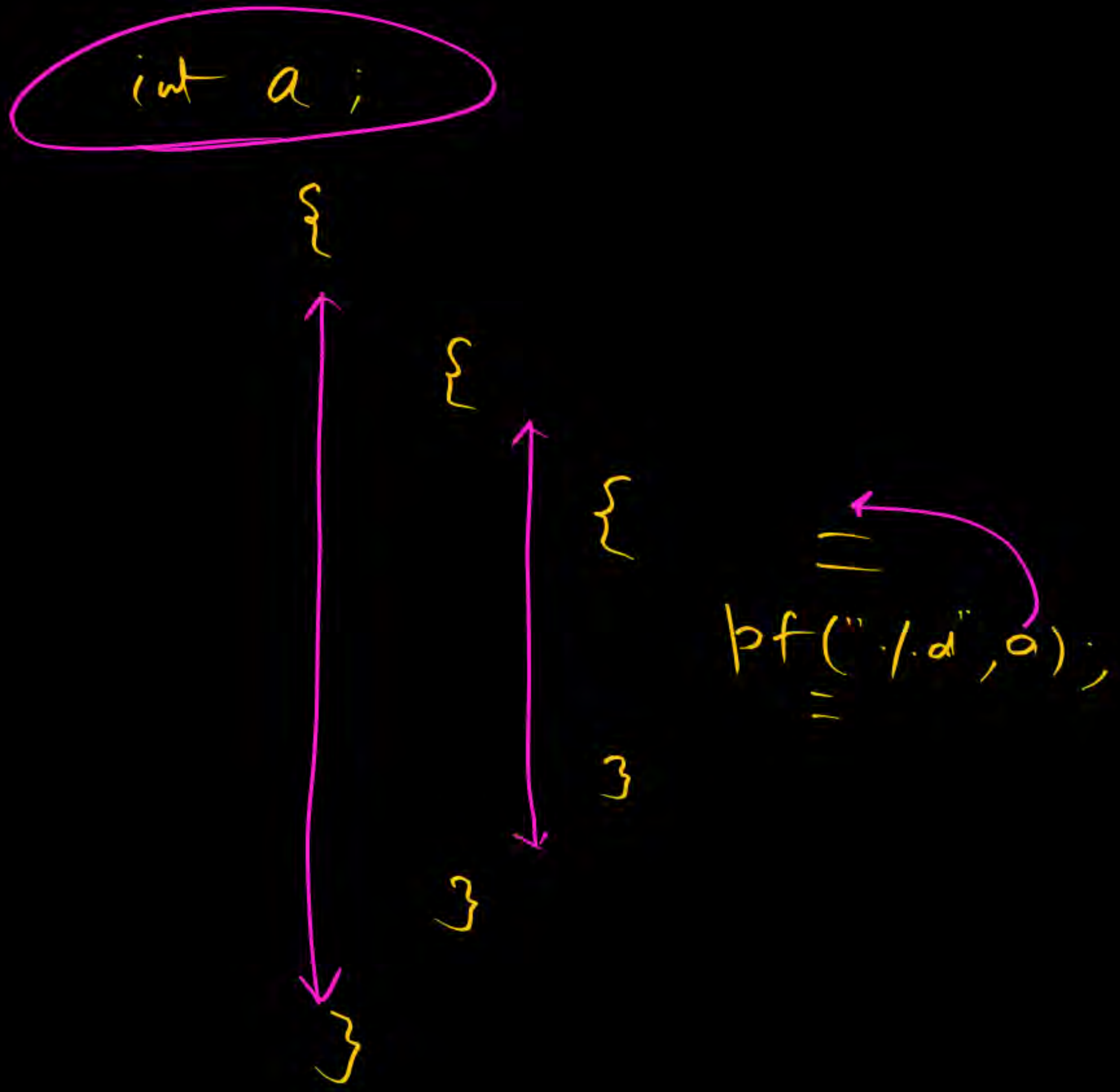
Trees

$$\begin{tikzcd}
 & \text{Scoping} \arrow[dl] \arrow[dr] & \\
\text{Static scoping/ ✓lexical scoping} & & \text{Dynamic scoping}
\end{tikzcd}$$

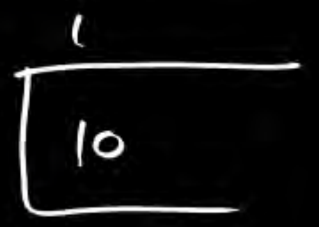
(1) Decision ⇒ Compile time

Modern C C++, Java, . . .

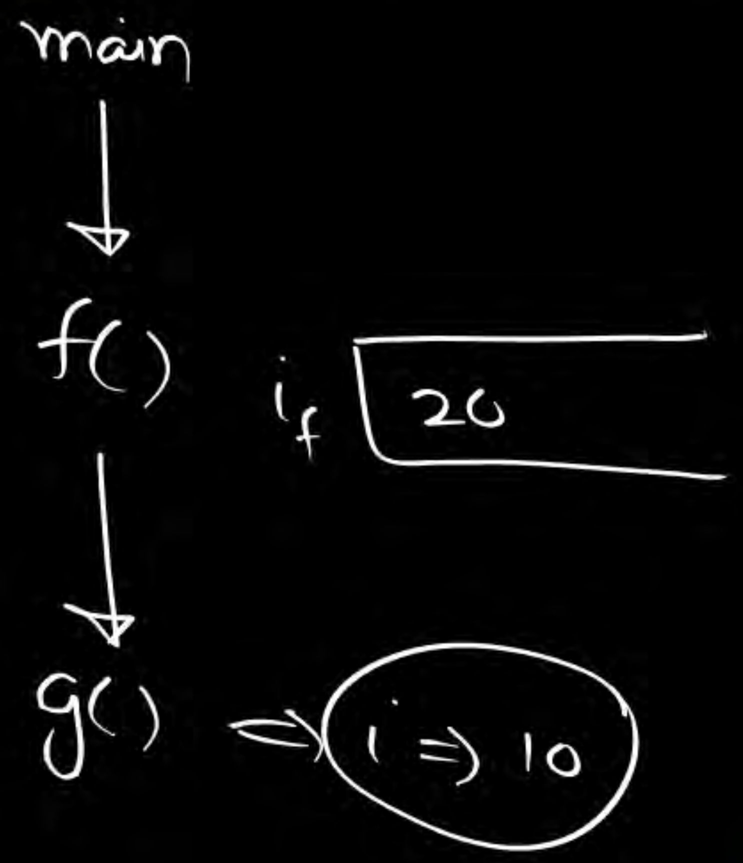
Scope related decision ⇒ Run time


int a ;
{
{
{
pf("%d",a);
}
}
}

Consider the program in a hypothetical lang. that allow global variable and a choice of static & dynamic scoping.



```
int i;
Program main(){
   global  i = 10;
           call f();
        }
Procedure f(){
           int i = 20;
           call g();
        }
Procedure g(){
           print(i);
        }
```



let x : value under static scoping

Consider the program in a hypothetical lang. that allow global variable and a choice of static & dynamic scoping.

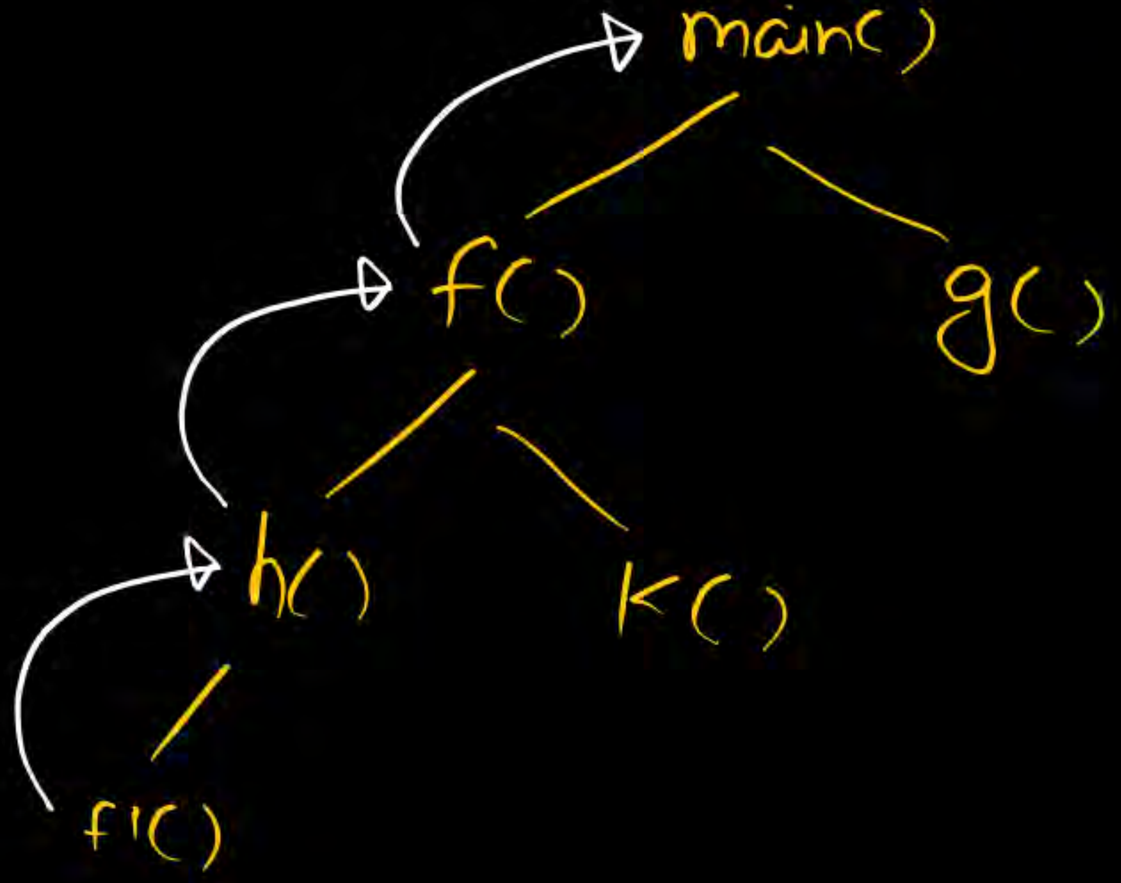
```
int i;
Program main(){
        i = 10;
        call f();
    }
Procedure f(){
        int i = 20;
        call g();
    }
Procedure g(){
        print(i);
    }
```

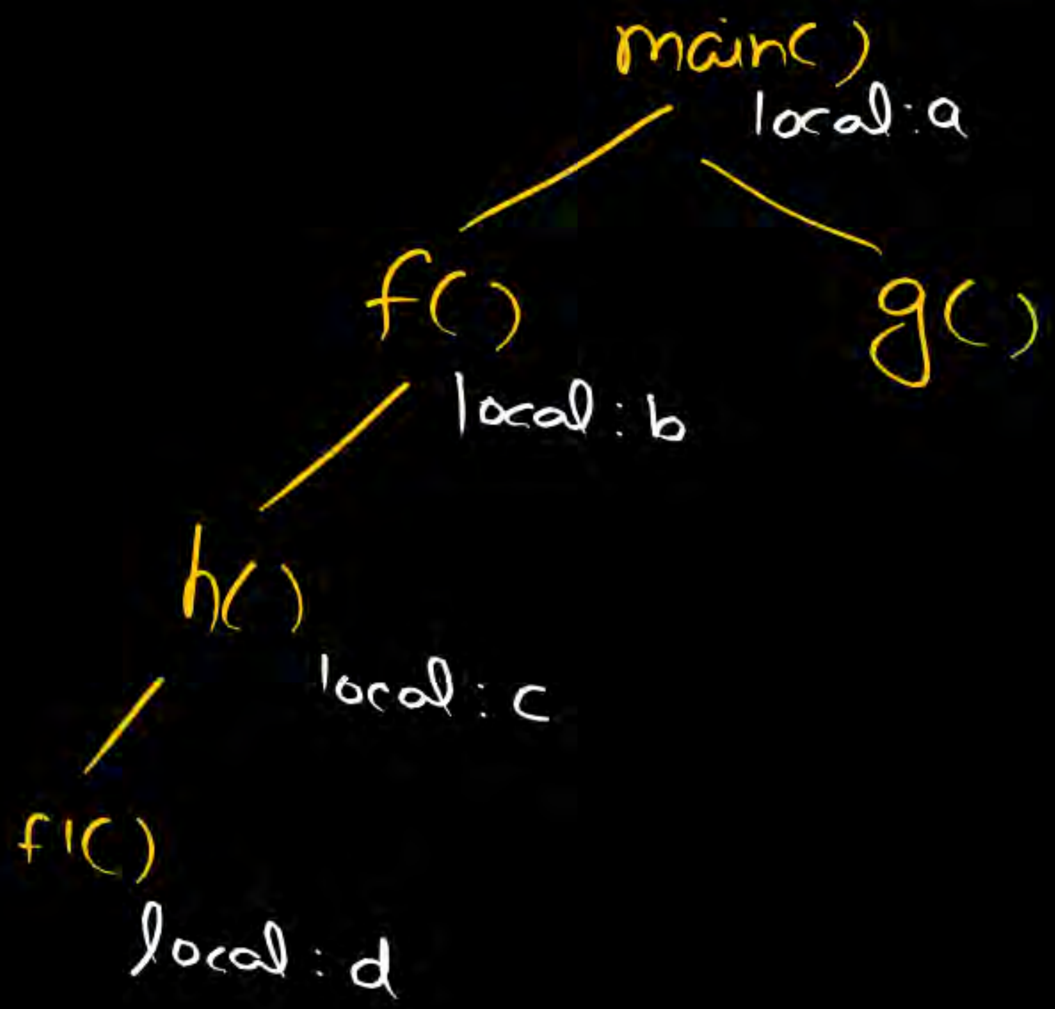
$$\begin{tikzcd}
\text{main} \arrow[d] \\
f() \\
g() \arrow[u, bend right, leftarrow] \arrow[u, leftarrow, start anchor=north, end anchor=south, phantom]
\end{tikzcd}$$

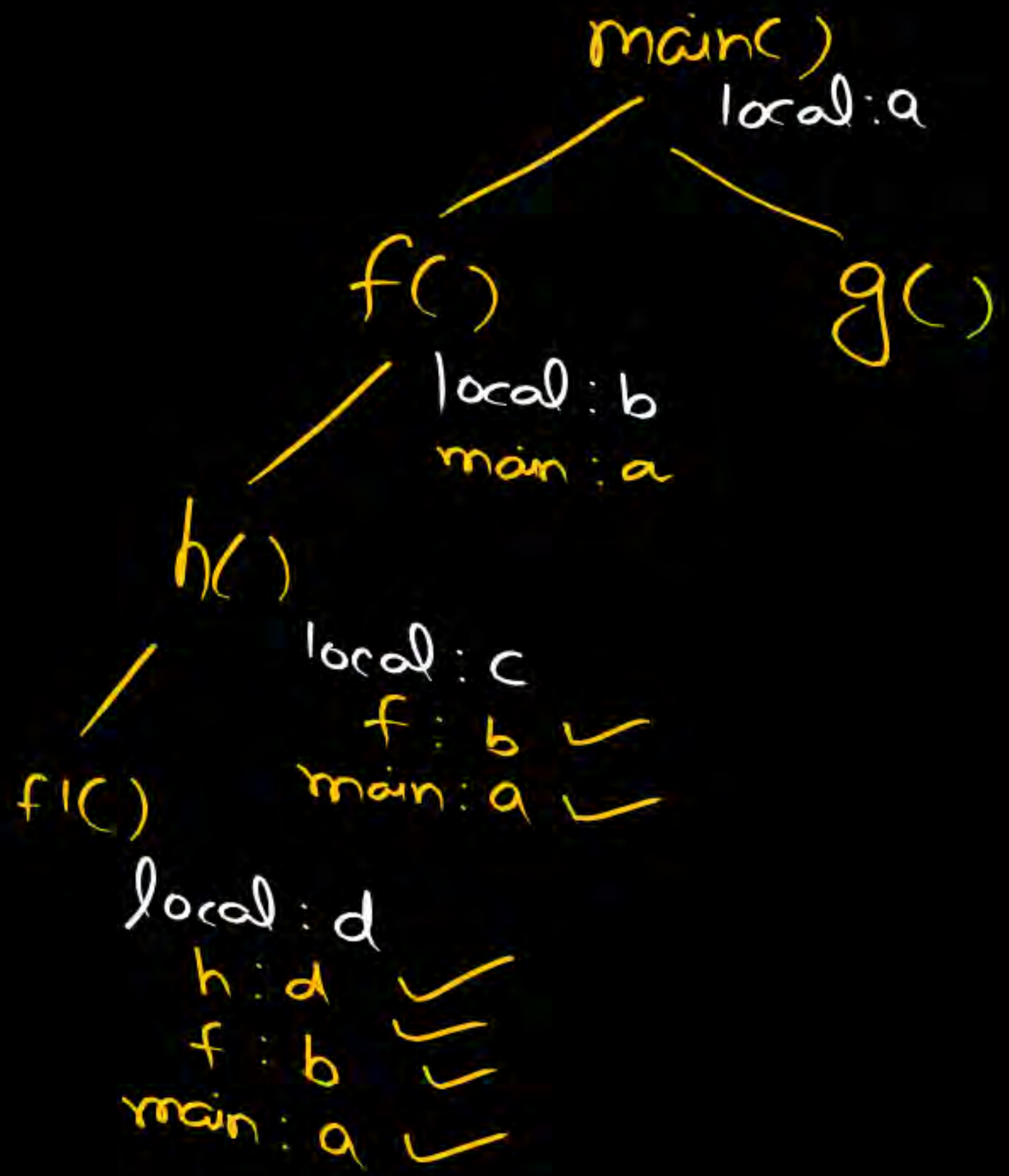
if $\boxed{20}$ $\Rightarrow 20$

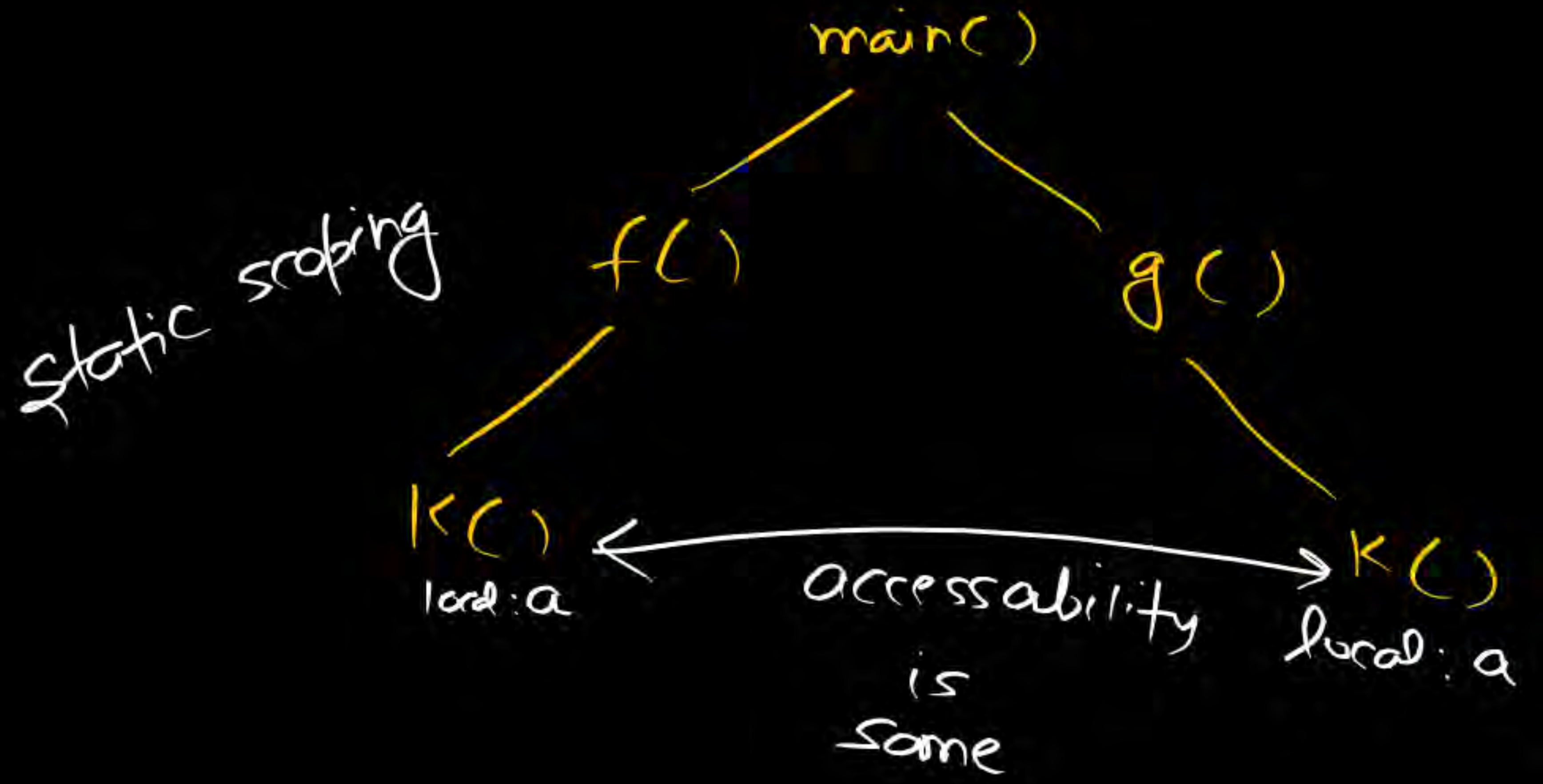
$\Rightarrow$ i ढूँढे मे

let y : value under dynamic scoping


main()
f()
g()
h()
k()
f'()

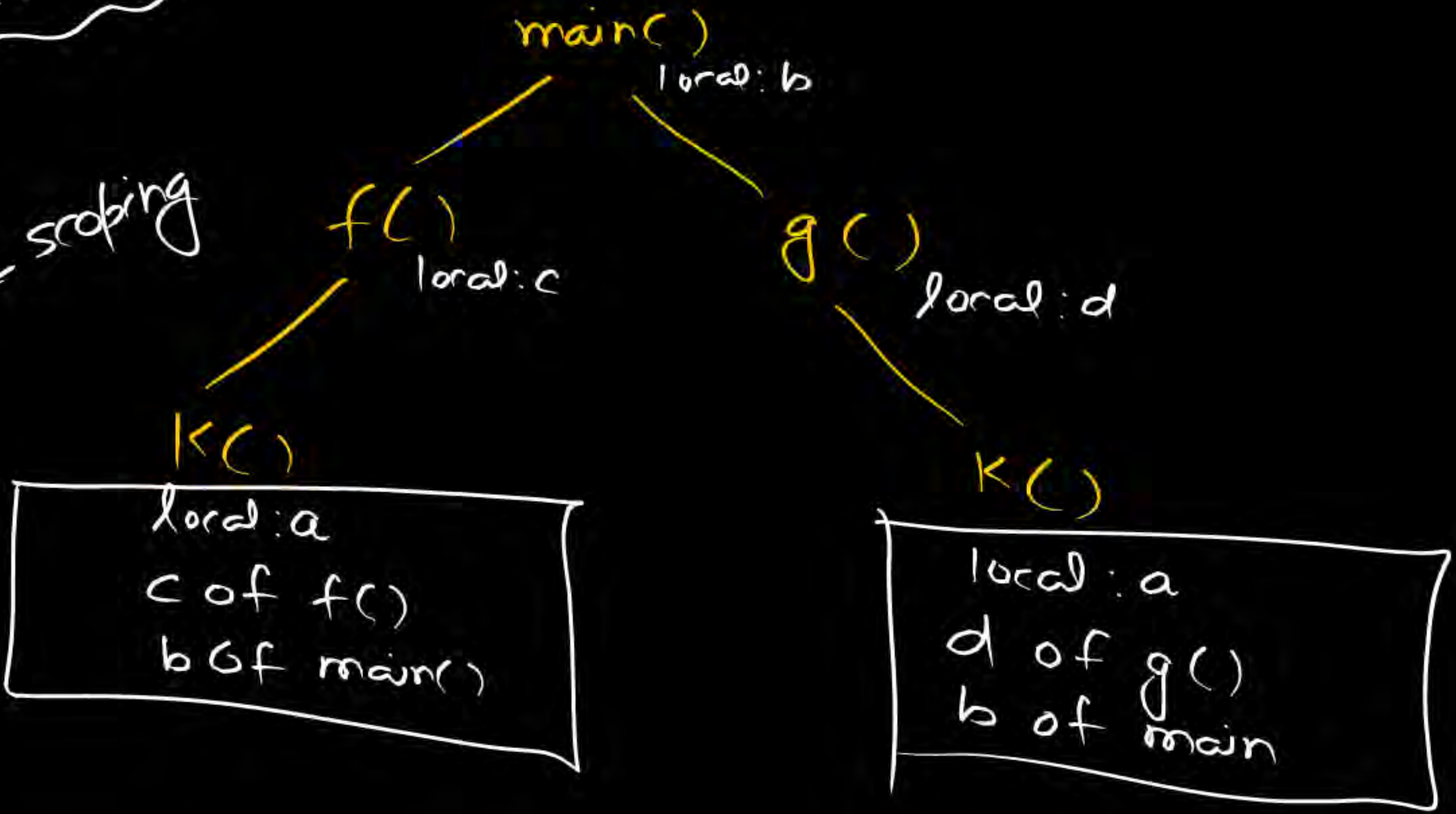

main()
local: a
f()
g()
local: b
h()
local: c
f'()
local: d


main()
local: a
f()
g()
local: b
main: a
h()
local: c
f: b ✓
main: a ✓
f'()
local: d
h: d ✓
f: b ✓
main: a ✓


static scoping
main( )
f( )
g( )
k( )
local: a
k( )
local: a
accessability
is
same

10 ⇒ Practice

dyn: ~~static~~ scoping



Preprocessor directive

```
#include<stdio.h>
# define MAX 10
void main(){

    printf("%d", MAX);

}
```

→ file inclusion

→ macro

Every occurrence of MAX is replaced by 10

Pre-
processor →

```
————
————
————
————
————
————
————

void main(){

    pf("%d", 10);

}
```

```
#define square(x) x*x

void main(){
        int i;
        i = square(5+3);
        pf("%d",i);
    }
```

```
int i;

i =  5+3 * 5+3;
pf("%d",i);
```

o/p : 23

sizeof

① compile time operator

$$\begin{tikzcd} & & \text{variable} \\ \text{② unary operator} \arrow[r, Rightarrow] & \text{1 operand} \arrow[ur] \arrow[r] \arrow[dr] \arrow[ddr] & \text{data type} \\ & & \text{Expression} \\ & & \text{constant/literal} \end{tikzcd}$$

int - 4byte
char - 1byte

No. of bytes ⟹ it can not be -ve

$\boxed{\text{Unsigned int}}$ sizeof(____)

```
int i = 2, j = 3;

pf("%u", sizeof(i));          -> 4
pf("%u", sizeof(i + 2 x j));  -> 4    Eval X
pf("%u", sizeof(2));          -> 4
pf("%u", sizeof(int));        -> 4
```

int + int + int → int

```
int  i = 1 , j ;
j = sizeof(++i);
pf("%d %d", i , j);
```

4

1 4

i ⟶ int

$\boxed{i=i+1}$ int

'ne x

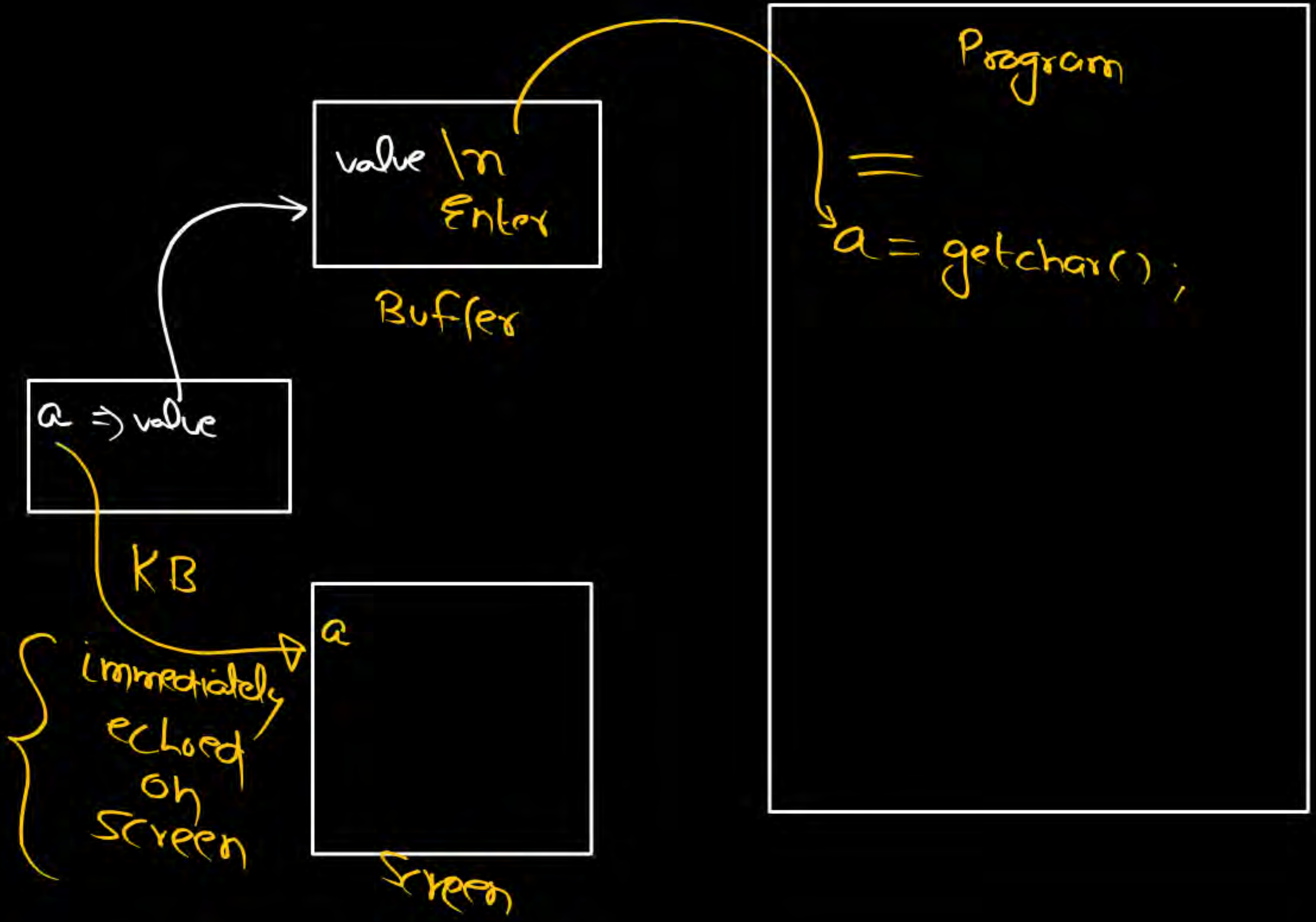
```
int a=2,b=3;

pf("%d", sizeof(a));
pf("%d", sizeof a );

sizeof(int)
sizeof int
sizeof(a+b×3);
sizeof a+b×3
sizeof(2)
sizeof 2
```

No paranthesis

getchar/getch/getche

① Buffered or not ?

② Echoed or not ?



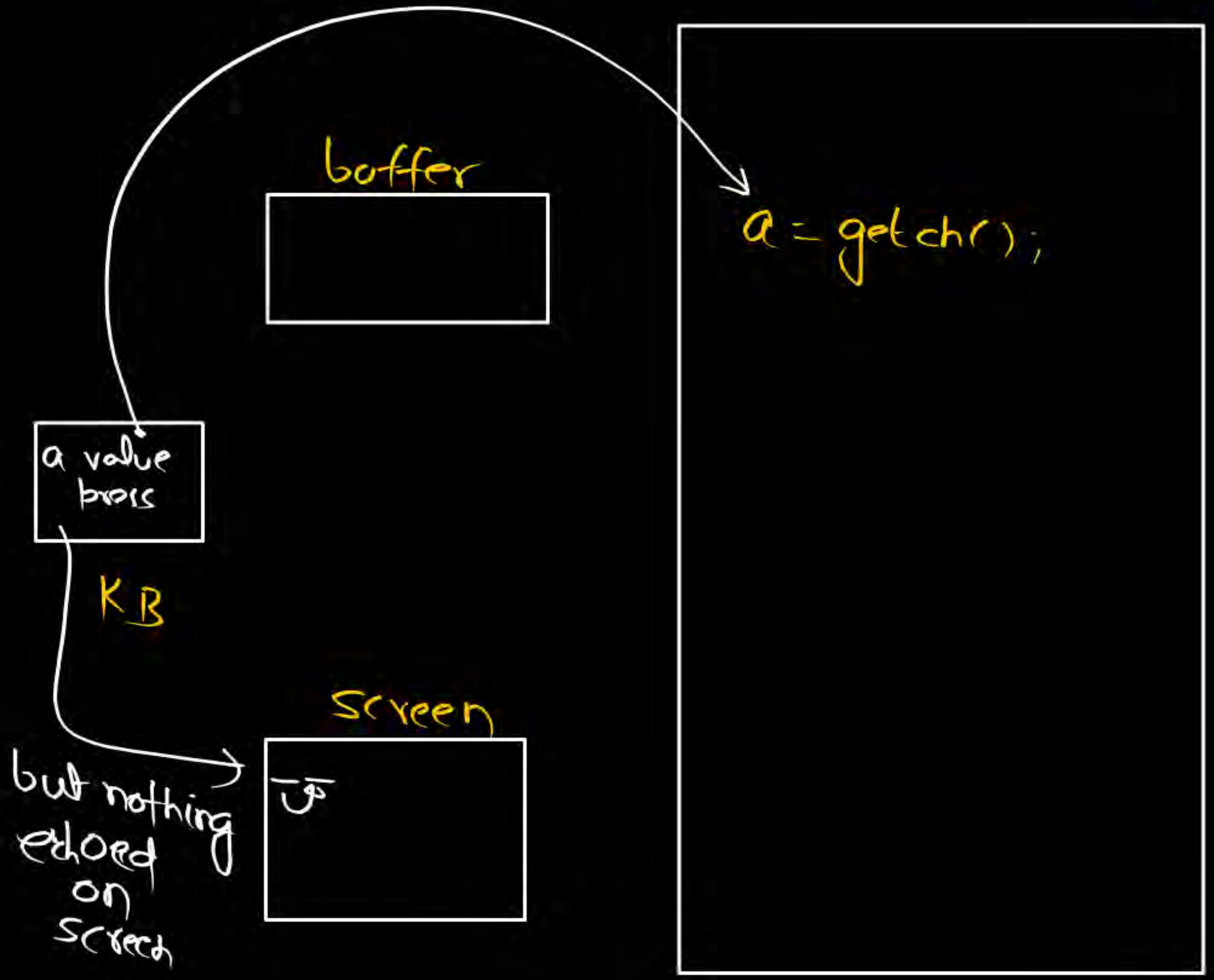
getchar

① buffer

② Echo

getch

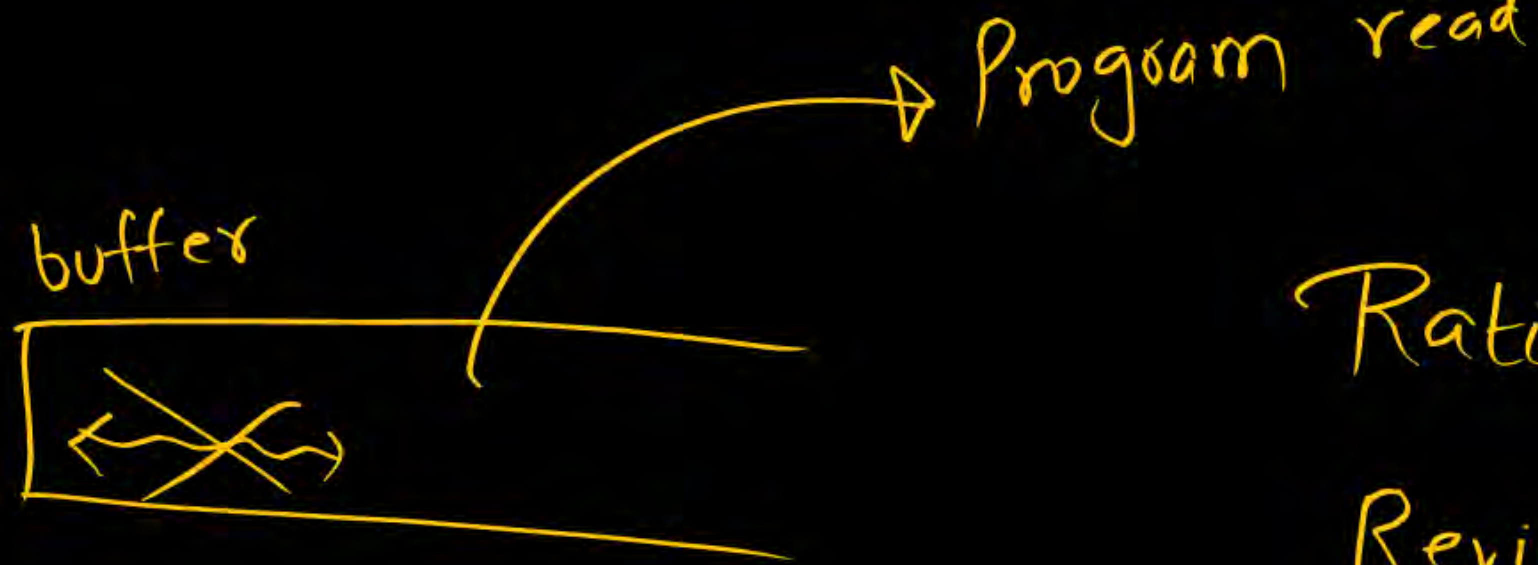
1. unbuffered
2. unechoed



getche

echo

unbuffered



Rating: Full C

Review/Feedback:

THANK YOU GW SOLDIERS !