

# CS & IT ENGINEERING

**Programming in C**  
**Chapter-2**  
**Control Flow Statements**  
**Lec- 01**




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TOPICS TO BE  
COVERED



Decision Control Statements-I

1.

int a; <sup>exp1 true</sup>

a = 12 > 2 ? printf("Gate") && printf("Wallah") || printf("2023") : <sup>exp3</sup> printf("sir"),  
printf("/d", a);

Short-circuit eval.

Eval x

a =  $\left( \overset{4}{pf("Gate")} \ \&\& \ \overset{6}{pf("Wallah")} \right) || pf("2023")$   
(4 && 6) || —

a = 1 || —

GateWallah1

2

int a;

a = 20 > 110 ? 100 : !2 != 3 > 50 ? 300 : 400 ;

exp1                      exp2                      exp3

pf("/d", a);

false

400

a = !2 != 3 > 50 ? 300 : 400 ;

exp1                      exp2                      exp3

!2 != 3 > 50

0 != 3 > 50

0 != 0

false

a = 400

false

! → logical operator

⇓  
0 or 1

!!!2

2

binary values

22



3.

int a;

a =  $\boxed{10 \mid = 12 > 50}$  ?  $\mid 4 \mid = 4$  ?  $8 > 8 \mid = 0$  ? 10 : 20 : 30 :  $\boxed{40}$  ;  
exp1 exp2 exp3

pf("/d", a);

← true →

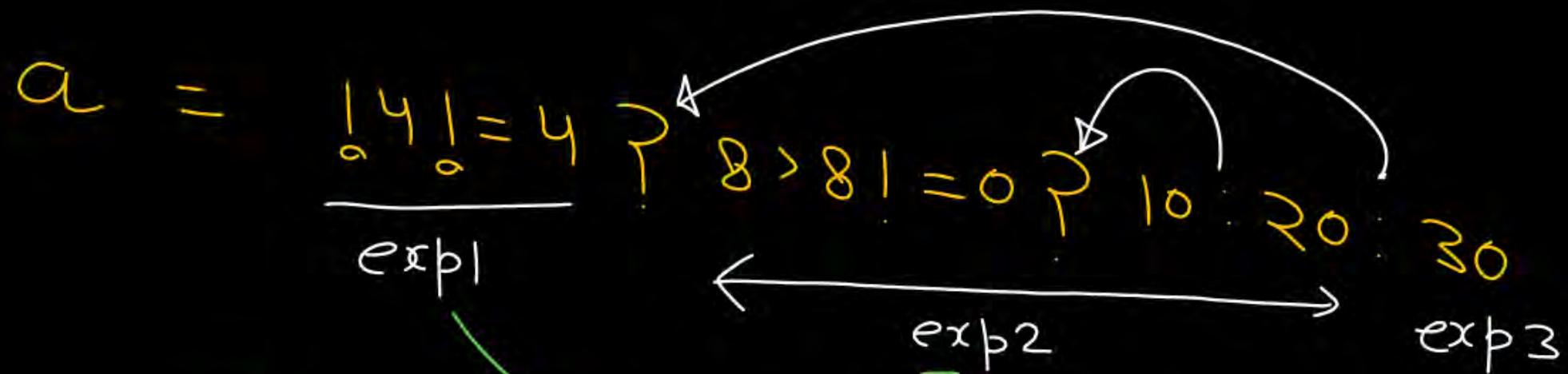
① <, >, <=, >=

② !=, ==

false  
 $10 \mid = \boxed{12 > 50}$

$\boxed{10 \mid = 0}$  true

3.



Unary  
 $(!4)! = 4$

$0! = 4$   
true

$8 > 8! = 0$

$0! = 0$   
false

$a = \boxed{8 > 8! = 0} \text{ ? } 10 \text{ : } 20$

$\boxed{a = 20}$

int a;

a = 2 > 5 ? 1 : 2 > 5 ? 10 : 20 : 5 < 8 ? 2 : 2 > 5 ? 15 : 30 : 111 = 1 ? 40 : 50 : 60 : 70;

exp1

exp2

exp3

false



int a;

$$21 = 2 > 5$$

$$21 = 0$$

true

$$a = \underbrace{5 < 8}_{\text{exp1}} ? \underbrace{21 = 2 > 5}_{\text{exp2}} ? \underbrace{!5}_{\text{exp3}} ? \underbrace{30 : |1| = 1}_{\text{exp3}} ? \underbrace{40 : 50 : 60 : 70}_{\text{exp3}},$$

true

$$a = \underbrace{21 = 2 > 5}_{\text{exp1}} ? \underbrace{!5}_{\text{exp2}} ? \underbrace{30 : |1| = 1}_{\text{exp2}} ? \underbrace{40 : 50 : 60}_{\text{exp3}},$$

$$a = !5 ? 30 : |1| = 1 ? 40 : 50$$

$$\begin{aligned} & \textcircled{1} 1 = 1 \\ & 0 = 1 \\ & \text{true} \end{aligned}$$

$$a = \underbrace{!5}_{\text{exp1}} \text{ ? } \underbrace{30}_{\text{exp2}} : \underbrace{!1=1}_{\text{exp3}} \text{ ? } 40 : 50$$

false

$$a = \underbrace{!1=1}_{\text{true}} \text{ ? } 40 : 50 ;$$

$$a = 40$$

# Flow control statements

```
#include <stdio.h>
```

```
void main() {
```

```
    S1 ;
```

```
    S2 ;
```

```
    S3 ;
```

```
    S4 ;
```

```
    S5 ;
```

```
    S6 ;
```

```
    S7 ;
```

```
    S8 ;
```

```
}
```

Sequential  
order





# Flow control statements

1.) Selection statement : if, if-else,  
switch

2.) Iterative statement (Repetition) : loops 

- for
- while
- do while loop

3.) Jump statements : continue  
break  
return  
exit

# Selection statement

```
#include<stdio.h>
```

```
void main(){
```

```
    S1;  
    S2;  
    S3;  
    S4;  
    S5;  
    S6;  
    S7;  
    S8;  
}
```

```
#include<stdio.h>
```

```
void main(){
```

```
    S1;
```

```
    S2;
```

```
    if(condition){
```

```
        S3;
```

```
        S4;
```

```
        S5;
```

```
    }
```

```
    S6;
```

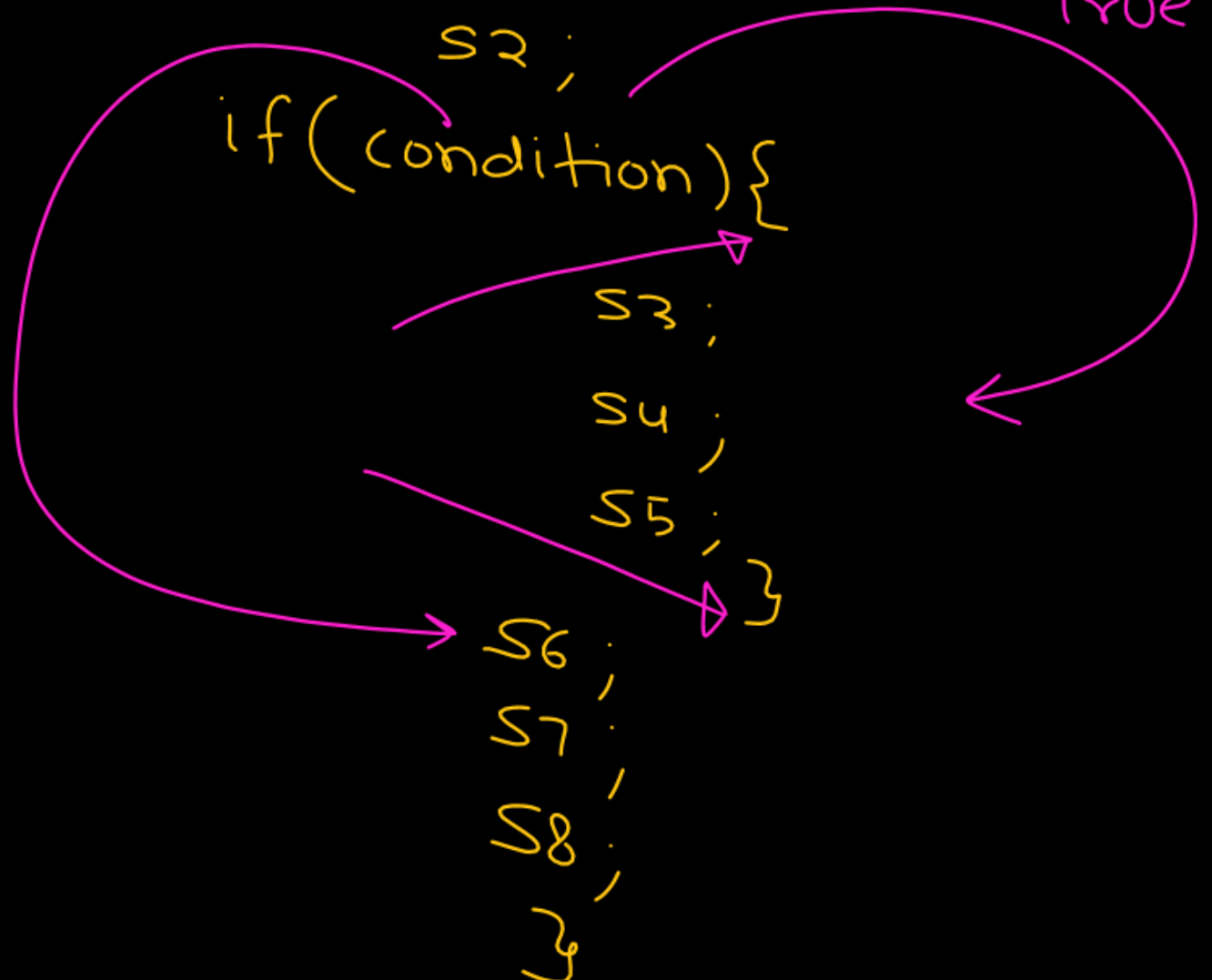
```
    S7;
```

```
    S8;
```

```
}
```

false

true



## Selection statement

1)  $S1 \rightarrow S2 \rightarrow S3 \rightarrow S4 \rightarrow S5 \rightarrow S6 \rightarrow S7 \rightarrow S8$

2)  $S1 \rightarrow S2 \rightarrow S6 \rightarrow S7 \rightarrow S8$

$S1;$   
 $S2;$

if(condition/expression){

$S3;$

$S4;$

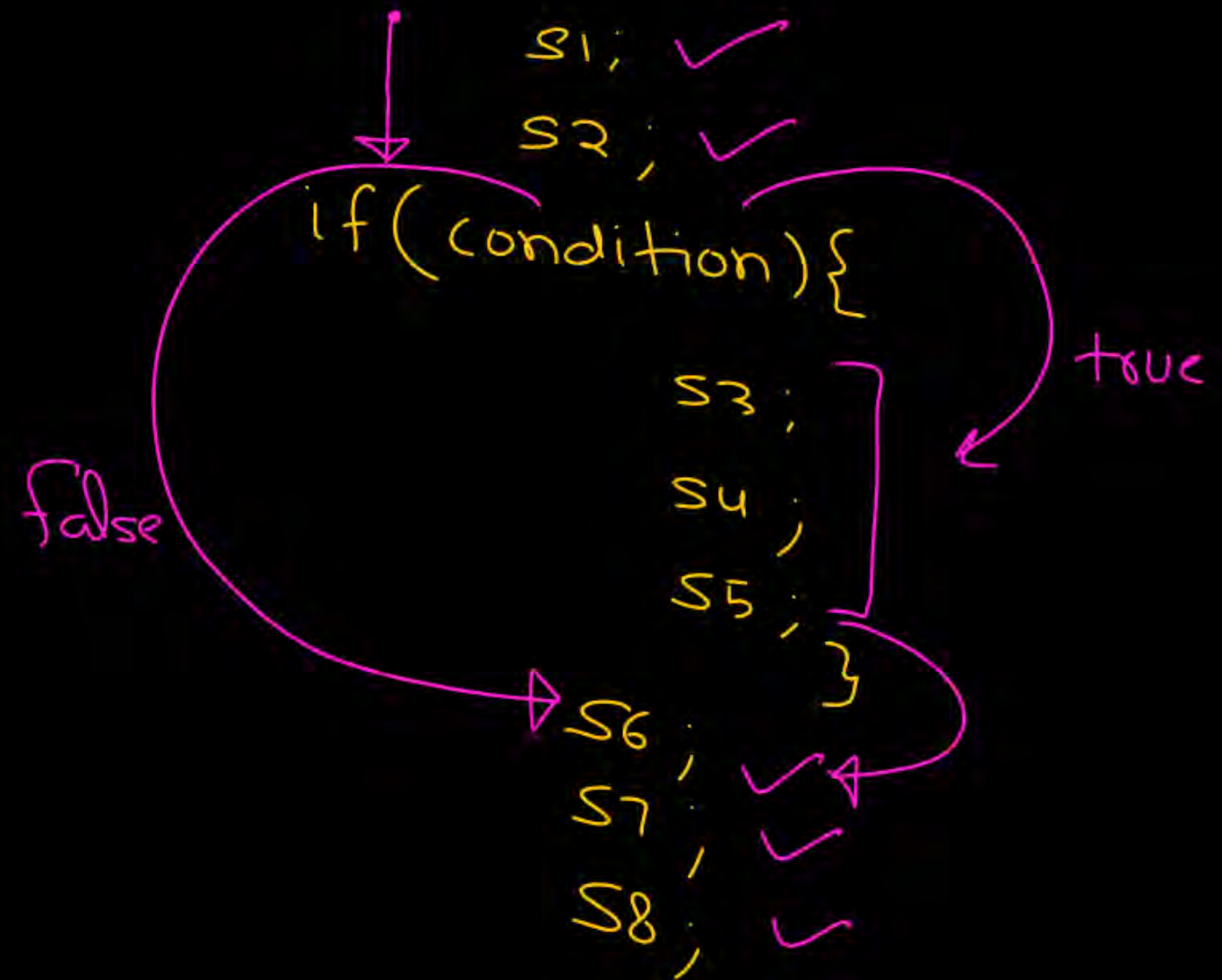
$S5;$

}

$S6;$

$S7;$

$S8;$





if (condition/ expression)

{  
S1;  
S2;  
S3;  
}

if (condition/ expression)

S1;  
S2;  
S3;

By default

⇒ till first semi-colon

Compiler

if (condition/ expression)

{  
S1;  
S2;  
S3;  
}

1/

```
void main(){
```

```
    printf("START");
```

```
    if(2 < 5){
```

```
        pf("0");
```

```
        pf("1");
```

```
    }
```

```
    pf("2");
```

```
}
```

START 012

2/

```
void main(){
```

```
    pf("1");
```

```
    if(5 < 2)
```

```
        pf("2");
```

```
        pf("3");
```

```
    pf("4");
```

```
}
```

if की scope  
 $\Rightarrow$  4 एक semi  
 -colon  
 तक

2

```
printf("1"); ✓  
if (5 < 2)  
{  
    printf("2"); ✗  
}  
printf("3"); ✓  
printf("4"); ✓  
134
```

False

```
void main(){
```

```
    printf("1"); ✓  
    if (5 < 2)  
        printf("2");  
        printf("3");  
    printf("4");  
}
```

if की scope  
⇒ 4th semi  
colon तक



✓  
int i = 2;

pf("1"); ✓

if( i + 2 ) {

pf("Hey bhagwan");

pf("Bacha lo");

}

pf("Is Rawan Se"); ✓

Expression → non-zero (true)  
 $i + 2 \Rightarrow 2 + 2 = 4$  (non-zero)

if(condition/expression)

{

}

true  
non-zero

3.

```
pf("He"); ✓  
if(2){  
    pf("Prabhu");  
    pf("Bacha lo");  
}  
pf("Is Rawan se"); ✓
```

non-zero (true)

HePrabhuBacha loIs Rawan Se

4.

```
pf("Hey"); ✓  
if(12){  
    pf("Bhagwan");  
    pf("Kab");  
}  
pf("Aaoge"); ✓
```

12 = 0 = false

X

HeyAaoge

All non-zero  $\Rightarrow$  true

0  $\Rightarrow$  false

```
if (-2)
{
```

```
  ✓ pf("1");
```

```
  ✓ pf("2");
```

```
}
```

```
✓ pf("3");
```

```
if (-12 - 38)
```

```
{
```

```
  ✓ pf("1");
```

```
}
```

```
✓ pf("2");
```

non-zero  
(true)

```
if (0.0)
```

```
{
```

```
  == X
```

```
}
```

```
if (0){
```

```
  == X
```

```
}
```



1. if(1)  
{  
=  
}

2. if(12.38)  
{  
=  
}

3. if(-1.2)  
{  
=  
}

4. if(0.0)  
{  
=  
}

5. if(0.01)  
{  
=  
}

6. if(  
{  
}

→ ud ke  
laak  
marega

int a=10;

if ( {  
3  
a+2  
a  
|a  
2  
|2  
|12.38  
-12  
0.0  
0

Expression

if ( printf("Hello") )

W

1.

```
void main() {  
    if (printf("Hello"))  
    {  
    }  
}
```

Hello

2.

```
void main() {  
    if (!printf("Pankaj"))  
    {  
    }  
    printf("Sharma");  
}
```

Pankaj

if(16) if(0)

!6 ⇒ 0 (false)

1. `int i = 1;`  
`if (--i)`

`printf("1");`  
`printf("2");`

$i$   

<del>1</del> 0
----------------

  
`if(0)`

2. `int i = 0;`  
`if (i++)`  
`{`  
`printf("/d", i);`  
`}`  
`printf("Hello");`

Post-increment  
(i) use  
(ii) increase

`if(0)`  
`{`  
`}`

]

Pre-decrement

- 1) First decrease
- 2) then use

O/P: 2

$i$   
`if (--i)`  
`{`  
`printf("1");`  
`}`  
`printf("2");`

Hello



WAP to read a number from user and if the no. is even, then print Pankaj

①

i/p : 12 ✓

o/p : Pankaj

i/p : 11  $\Rightarrow$  odd

o/p :

i/p : 0

o/p : Pankaj ✓

i/p : 3  $\Rightarrow$  odd

o/p :

```
int n
```

```
pf("Enter a no.");
```

```
sf("%d", &n)
```

```
if( n%2 == 0 )
```

```
printf("Pankaj");
```

②

0  $\Rightarrow 2x \Rightarrow \text{Even}$

12:

$$\begin{array}{r} 1 \Rightarrow \begin{array}{|c|} \hline 00001100 \\ \hline 00000001 \\ \hline \end{array} \\ \hline 00000000 \end{array}$$

$$\begin{array}{r} \begin{array}{|c|} \hline 11111111 \\ \hline 00000001 \\ \hline \end{array} \\ \hline 00000000 \end{array}$$

Even no

$$\begin{array}{r} 1 \\ 1 \\ = 0 \end{array}$$

$$\begin{array}{r} b_7 b_6 b_5 b_4 b_3 b_2 b_1 b_0 \\ 00000001 \\ \hline 00000000 \end{array}$$

odd no.  $b_0 = 1$   
odd no  $\& 1 == 1$

$\rightarrow 0$  if  $b_0 = 0$

X  $\text{if}(n \& 1)$   
 $\text{printf}(\text{"Pankaj"});$

$n = 12$

$12 \& 1 = 0$

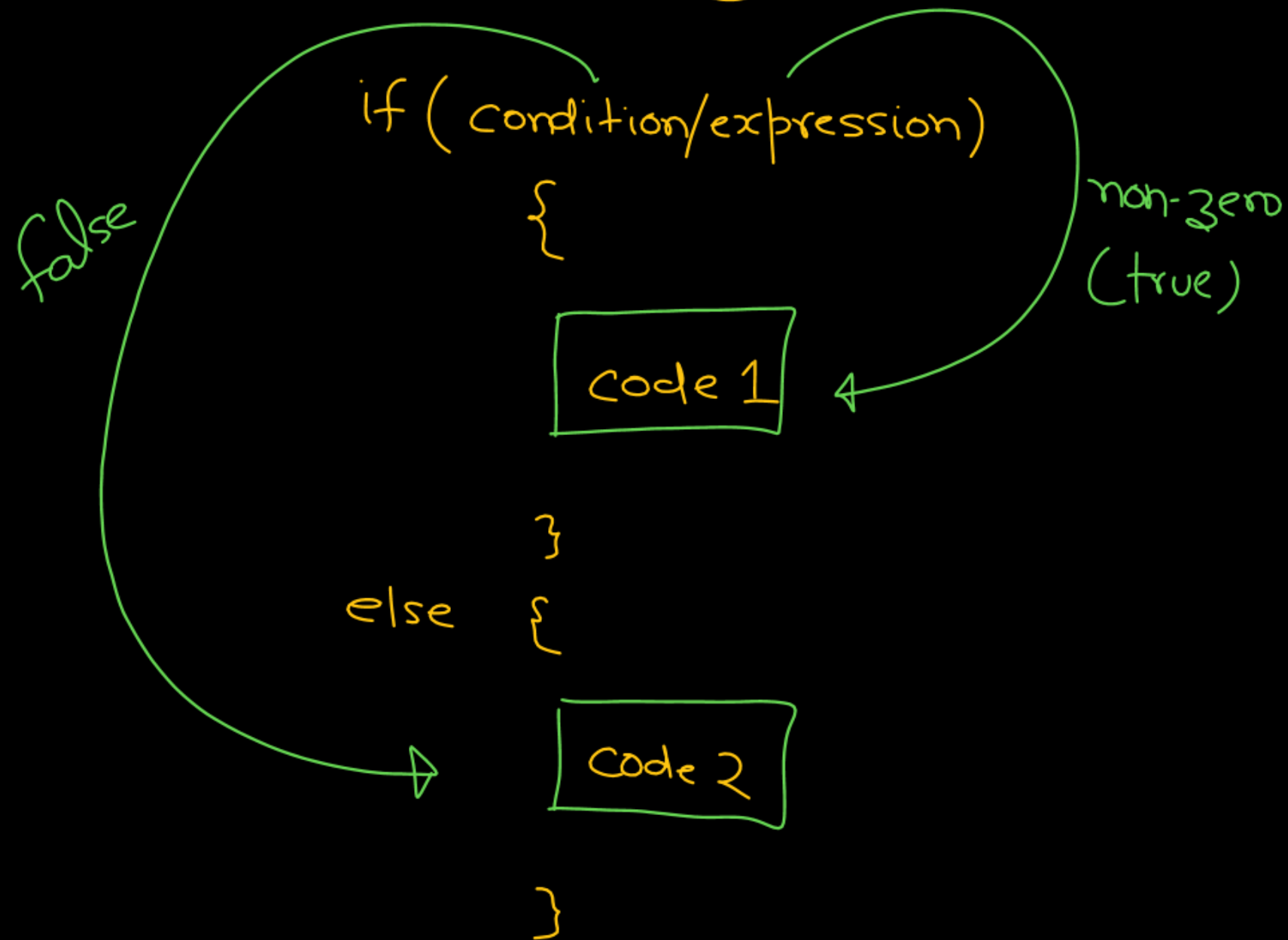
$\text{if}(0)$

X  $\text{pf}(\text{"Pankaj"});$

$\text{if}(n \& 1 == 0)$   
 $\text{print}(\text{"Pankaj"});$

$\text{if}(\text{!}(n \& 1))$   
 $\text{pf}(\text{"Pankaj"});$

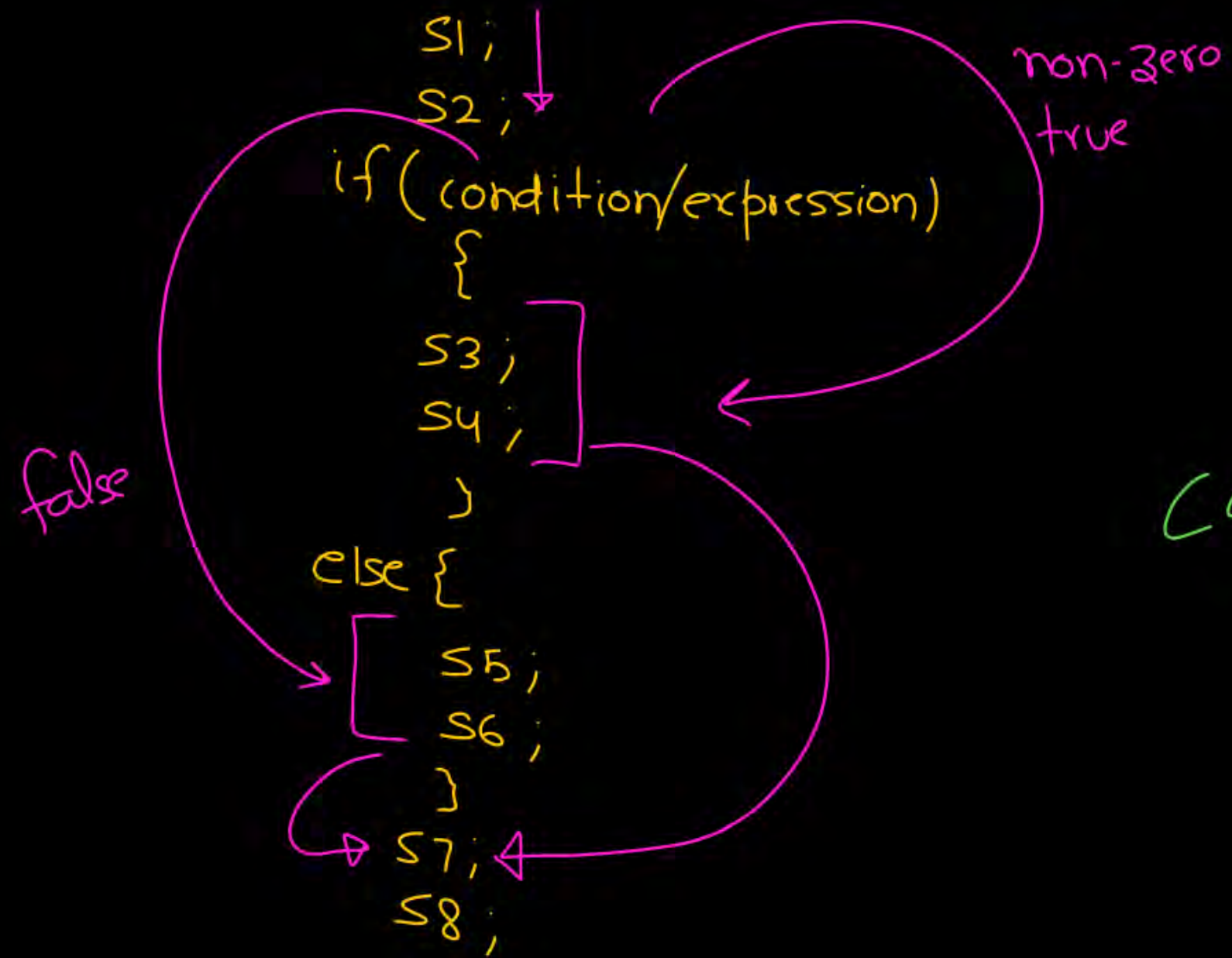
## Selection



else : otherwise

↘  
associate an  
alternate block  
of code (to  
be executed when  
if condition is  
false)





$S1 \rightarrow S2 \rightarrow S3 \rightarrow S4 \rightarrow S7 \rightarrow S8$

$S1 \rightarrow S2 \rightarrow S5 \rightarrow S6 \rightarrow S7 \rightarrow S8$

void main() {

Compiler  
Ud ke  
laal-  
matega

else

pf("Pankaj");

}

