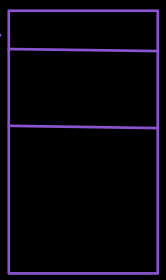
data types

- int
- long
- float
- double

```
int a;
long b;
```




```
import java.util.*;
;
Scanner s = new Scanner(System.in);

int a;
long b;

a = s.nextInt();
b = s.nextLong();
```

} why?

Java

(1) am teaching.

Q 1

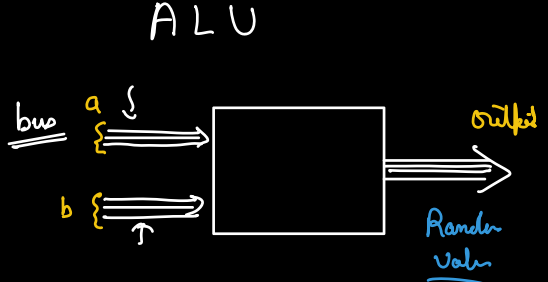
```
int a = 1000000000000;
```

⚠

Q 2

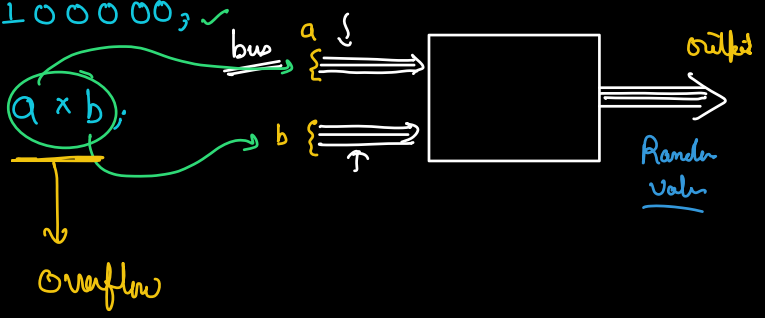
```
int a = 100000;   ✓
int b = 100000;   ✓
SOP(a*b);
```

→ overflow



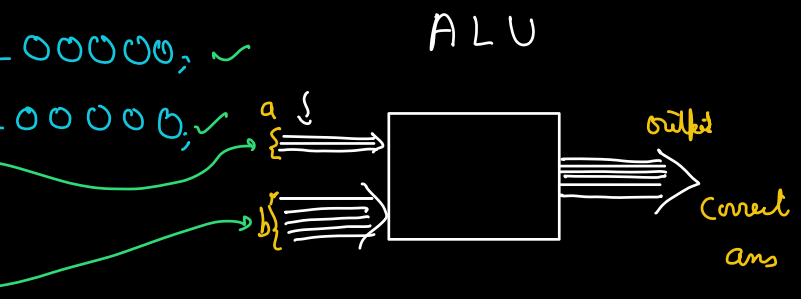
Q3

```
int a = 100000;
int b = 100000;
long c = (a * b);
SOP(c);
```



Q4

```
int a = 100000;
long b = 100000;
SOP((a*b));
```



a × b

If both a & b are int ⟶ ans can overflow

If any of a & b is long ⟶ ans will be long (might not overflow)

What if ..... ?

→ Write code & check.

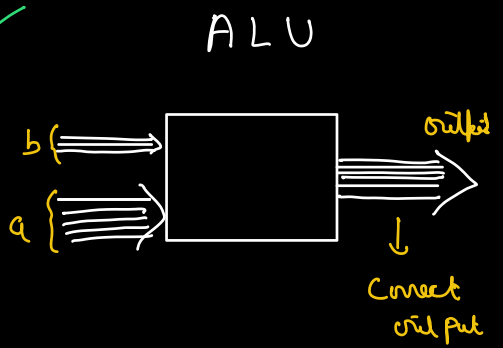
→ Try to find ans of why?

- google
- Peers / Instructi / TAs

Q 5

```
int a = 1000000;
int b = 1000000;
long c = (long) a x b;
SOP(c);
```

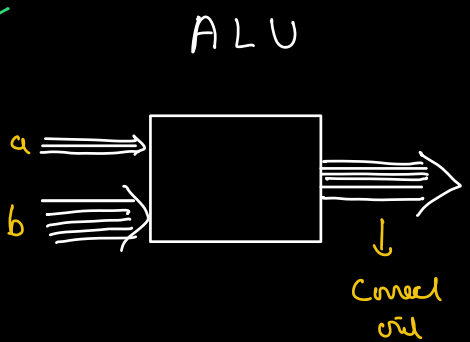
Type Casting



Q 5

```
int a = 1000000;
int b = 1000000;
long c = a x (long) b;
SOP(c);
```

Type Casting



Q Can variable name start from digit → False

Q Can variable name start from '_' → True

Q
```
int a = 1000000;
long b = 10;
```

is a > b ? ⟶ True

Q `int a = 10; long b = 10;`

is a equal to b ? ⟶ True

10

10

True / False

1 0

boolean data type

```
boolean a = 10;   ✗

boolean a = true;
boolean b = false;
```

keywords

0

1

Operators (+, -, /, *)

a + b ⟶ sum of a & b

a < b ⟶ boolean

true

false

Relational operators

		a = 3; b = 10	a = 100; b = 50;
>	a > b	false	true
<	a < b	true	false
>=	a >= b	false	true
<=	a <= b	true	false

= ⟶ assigning values

```
a = 10;
b = 20;
a = b;
```

(20)

```
SOP(a); ⟶ 20
SOP(b); ⟶ 20
```

(a x b) = 10 ✗

a = b x c ✓

==

a == b

→ a equals to b ? ✓

→ a double equals to
or
equal equals to

} to avoid confusion or error

```
int a = 10;
long b = 10;
SOP(a == b); ⟶ true
SOP(a == 15); ⟶ false
```

!= ⟶ Not equals to

```
SOP(a != b) ⟶ false
SOP(b != 10) ⟶ false
SOP(b != 15) ⟶ true
```

Logical operator

95%

Getting into IIT

Mark in 12th >= 75 %

and

marks in JEE >= Cut off

1st Jan

20th Jan

1st Feb

distance >= 500 Km

OR

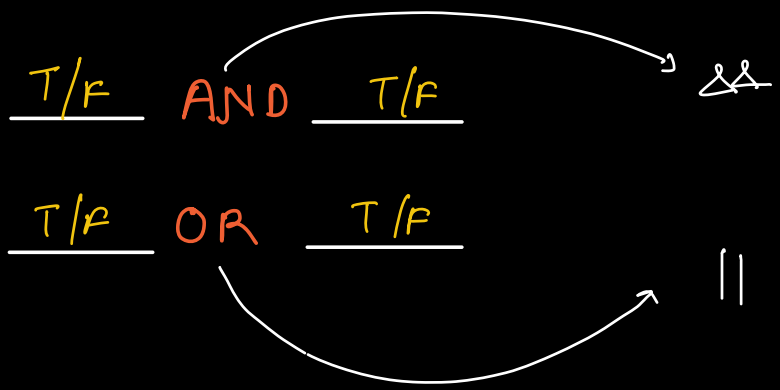
It has been one month

Temp >= 100°F

and

SPO_2 <= 90%.

} → RTPCR



a	b	a && b	a || b
T	T	T	T
T	F	F	T
F	T	F	T
F	F	F	F

$(10 != 3)$ && $(4 < 2)$ ⟶ F

T F

$(100 > 25)$ && $(6 <= 10)$ ⟶ T

T T

$((10 > 7)$ && $(5 < 8))$ && $(2 > 17)$ ⟶ F

T T T F

$(3 < 5)$ || $(2 < 10)$ ⟶ T

T T

$(2 > 10)$ || $(5 > 1)$ ⟶ T

F T

$((2 < 1)$ || $((5 > 3)$ && $(6 >= 1))$ || $(100 < 10)$ ⟶ T

F T T T T ~

$$\underbrace{(1>5)}_{F} \;\&\&\; \underbrace{(((2>1)\,||\,(5!=6))\;\&\&\;(3==3))}_{T} \longrightarrow F$$

a || b

if a ⟶ true, no need to evaluate b

a && b

if a ⟶ false, no need to evaluate b.

Q

SOP((5>3) && (8>5)); ⟶ T

(5>3) → T, (8>5) → T

3%

Q

SOP((5<3) || (8>5)); ⟶ T

(5<3) → F, (8>5) → T

11%

Q

SOP ((5<3) || (8<5)); ⟶ F

(5<3) → F, (8<5) → F

20%

int a = 4;

int b = 5;

a = a + b;
    4   5

Sop(a); ⟶ 9

Sop(b); ⟶ 5

a = a + b;
    9   5

Sop(a) ⟶ 14

b = a + b;
    14 5

Sop(b) ⟶ 19

a = a + 1; ⟹ a++;
    14

Sop(a) ⟶ 15

a = a + 1; ⟹ a++;
    15

Sop(a) ⟶ 16

a = a - 1; ⟶ 15 ⟹ a--
    16

a++ ⟶ a = a+1;

a-- ⟶ a = a-1;

a = a+2; ⟶ a += 2

a = a+3; ⟶ a += 3

a = a+x ⟶ a += x

a = a-x ⟶ a -= x

a = a*x ⟶ a *= x

a = a/x ⟶ a /= x

Q

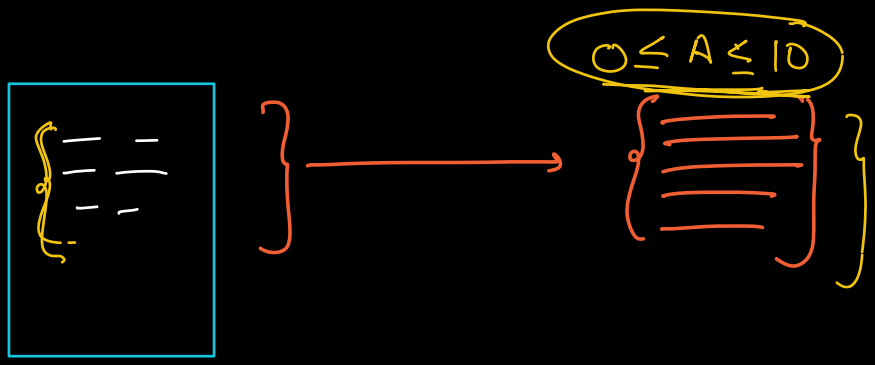
```
int a = 10;
int b = 5;
a += b; → a = a+b;
          10 5
SOP(a);
```

⟶ 10

Q

```
int a = 4;
a += 10; → a=a+10
SOP(a);
```

⟶ 14.


0 ≤ A ≤ 10