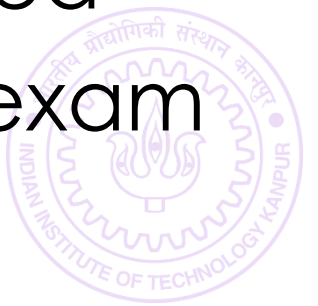
Mr C stands in a line

ESC101: Fundamentals of Computing

Purushottam Kar

Lab Exam (Sun, 09 Sep)

- Come only to your assigned session at least 15 minutes before start of exam – assigned seating will be there!
- **BRING YOUR INSTITUTE ID CARD, HANDWRITTEN NOTES**
- **DO NOT BRING YOUR MOBILE PHONES/IPADS TO EXAM**
- Syllabus – till loops (no arrays)
- **NO** printouts, photocopies, slides, websites allowed
- Prutor CodeBook will be unavailable during lab exam
- **TA HELP WILL NOT BE AVAILABLE DURING EXAM**



Lab Exam (Sun, 09 Sep)

- Morning exam (Wed, Thu batches)
  - 10:30 AM - 1:30 PM – starts 10:30 AM sharp
  - **CC-01**: B9, {B14 even roll numbers}
  - **CC-02**: B7, B10, B11
  - **CC-03**: B12
  - **MATH-LINUX**: B8, {B14 odd roll numbers}
- Go see your room during this week's lab
- Be there 15 minutes before your exam 10:15AM
- Cannot switch to afternoon session

Lab Exam (Sun, 09 Sep)

- Afternoon exam (Mon, Tue batches)
  - 2 PM - 5 PM – starts 2 PM sharp
  - **CC-01**: B1, {B2 even roll numbers}
  - **CC-02**: B4, B5, B6
  - **CC-03**: B3
  - **MATH-LINUX**: B13, {B2 odd roll numbers}
- Go see your room during this week's lab
- Be there 15 minutes before your exam 1:45 PM
- Cannot switch to morning session

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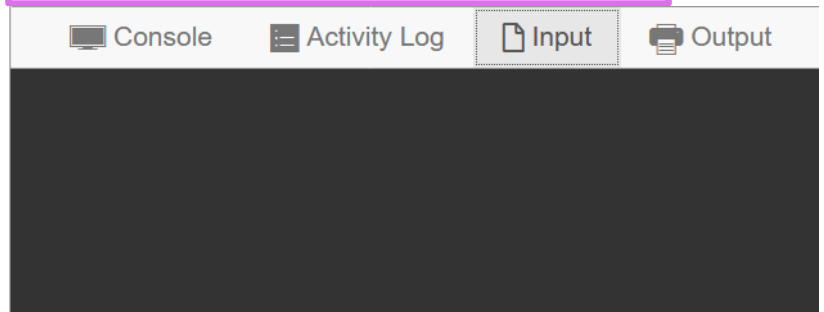

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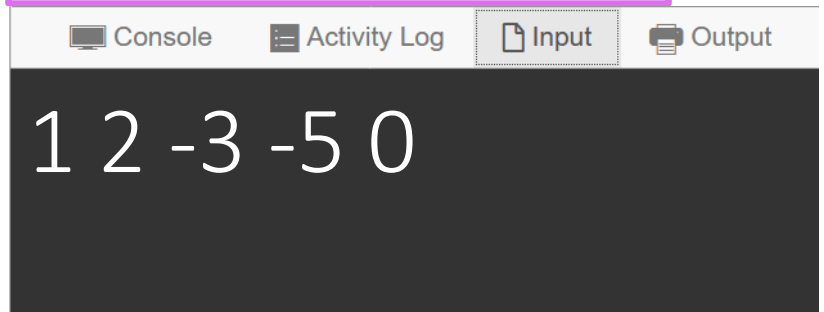

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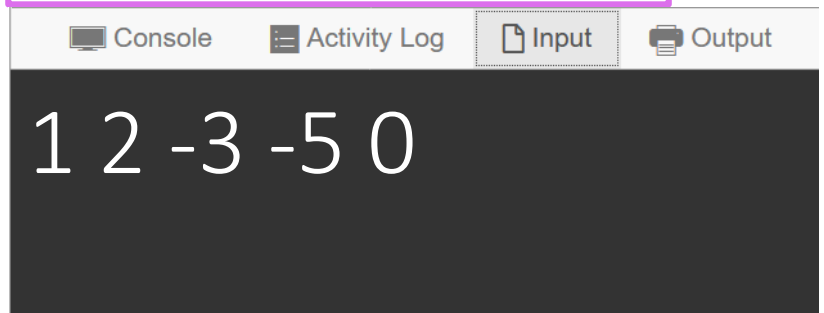

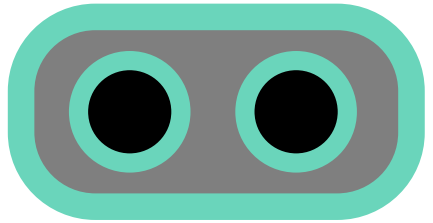

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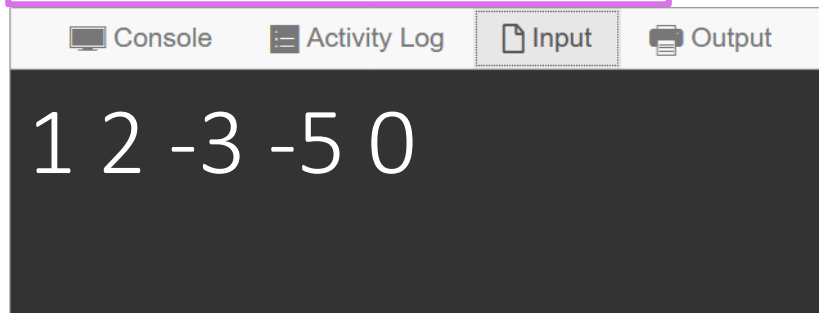

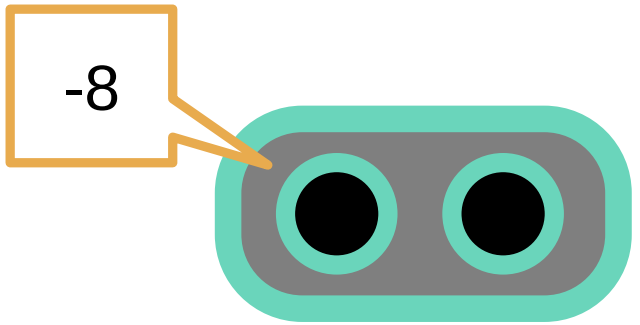

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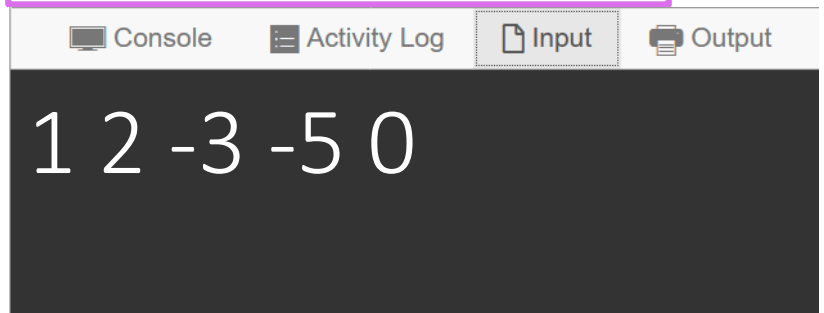

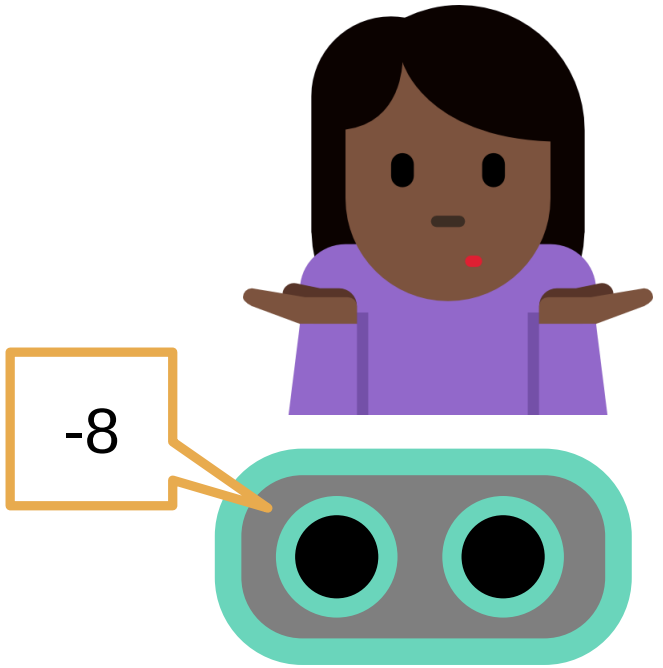

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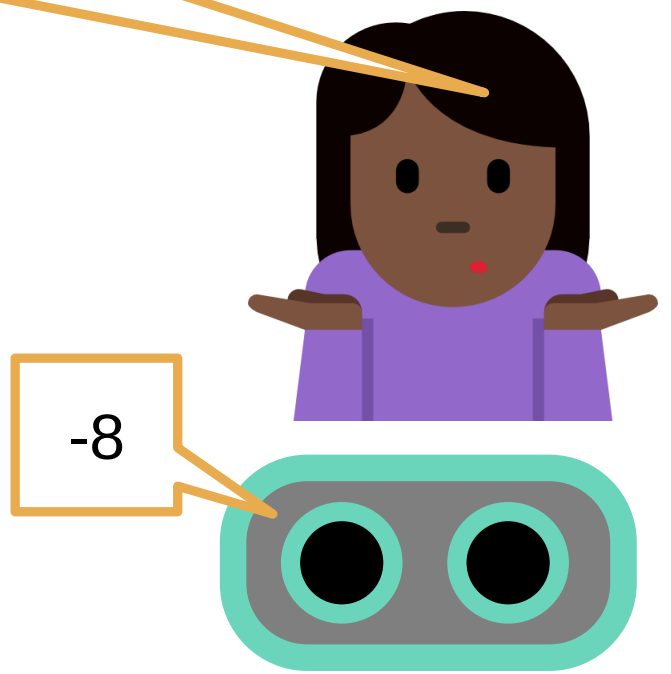

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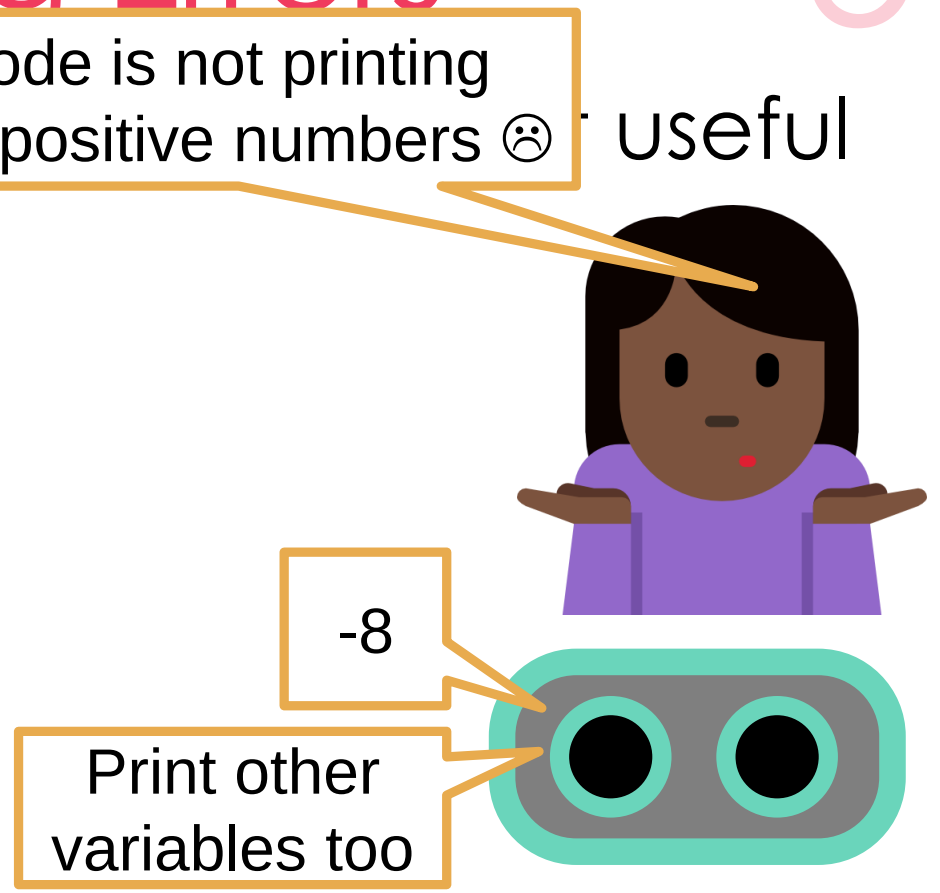

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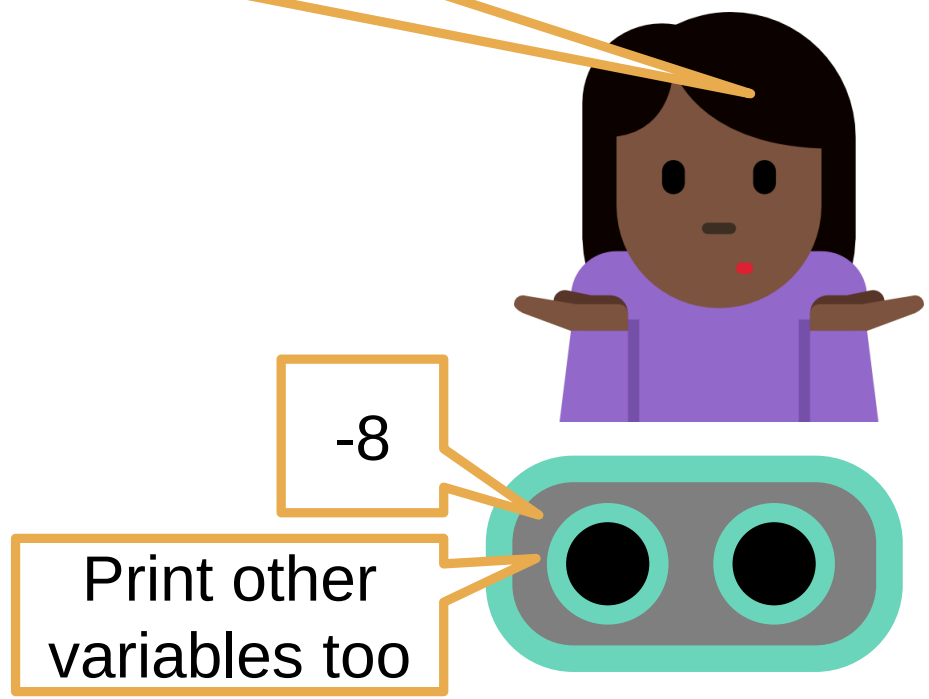

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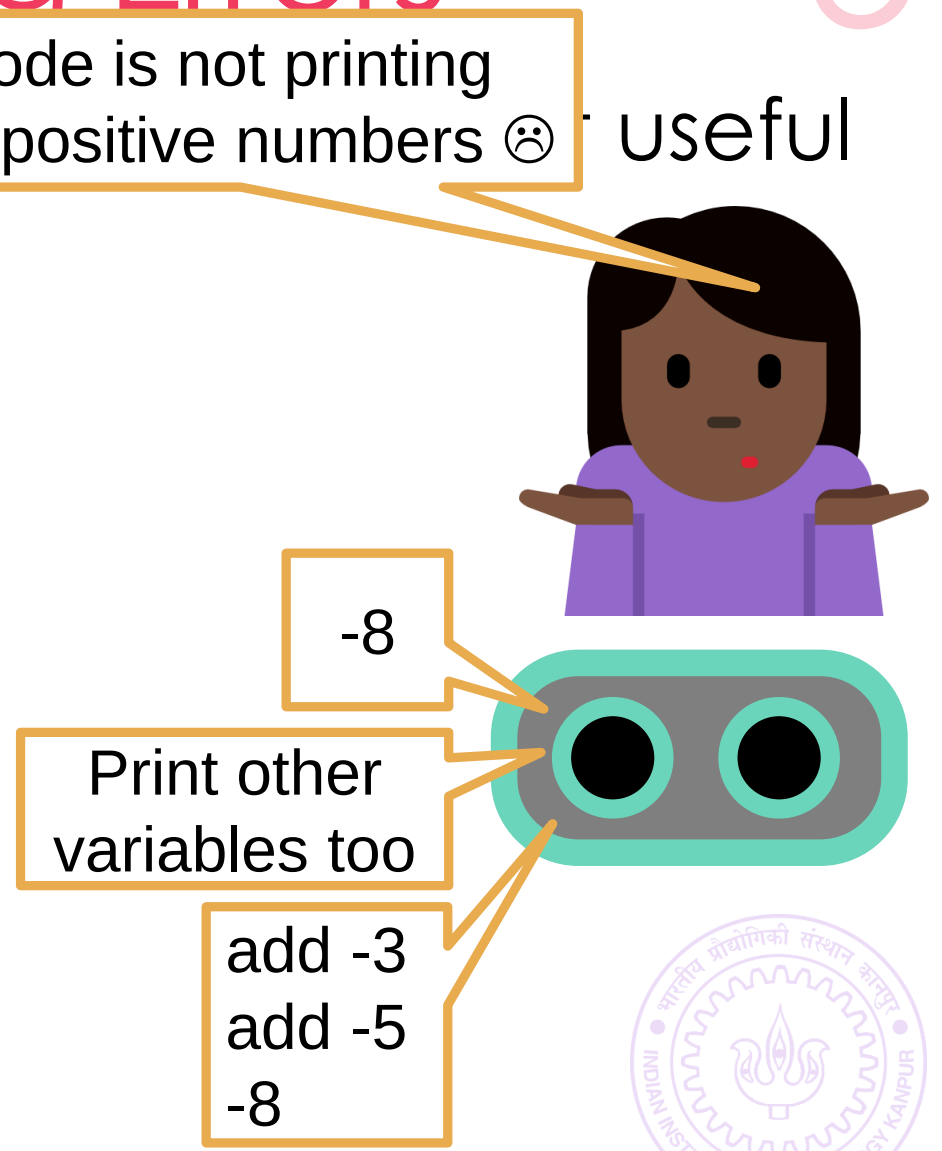

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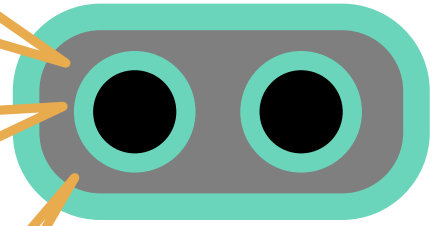

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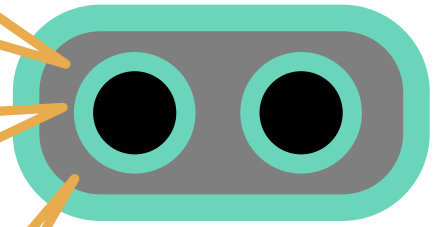

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Other tools called *debuggers* also widely used

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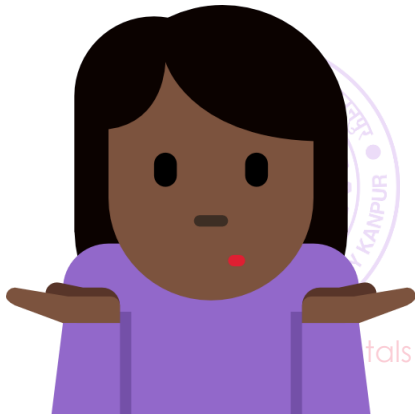

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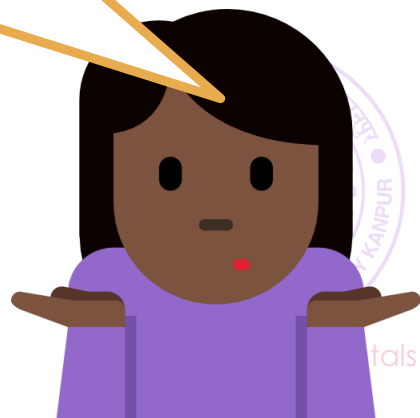

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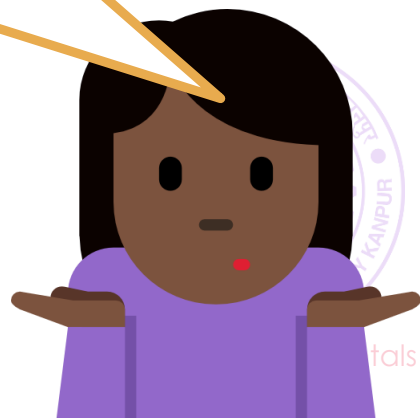

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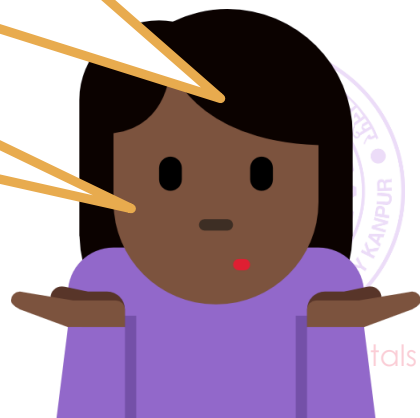

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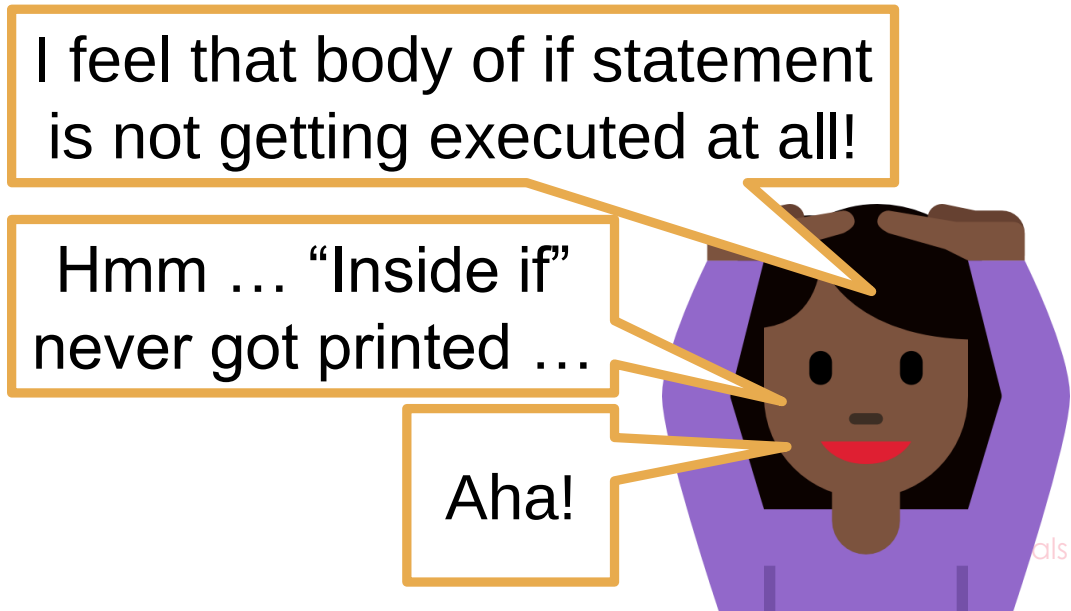

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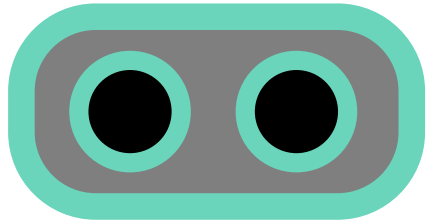

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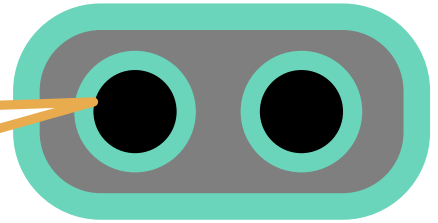

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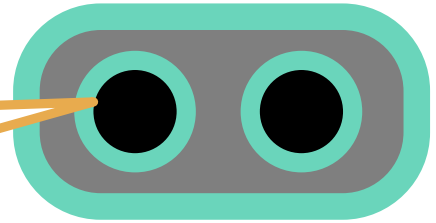

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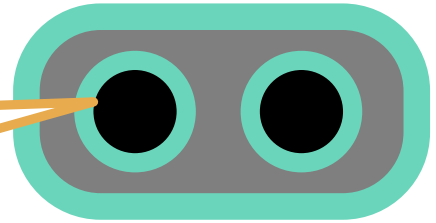
        sum += num;
}
```

```
int sum = 0, i, j, num;
for(i = 1; i <= 5; i++){
    j = i % 2;
    if(j = 0){
        sum += num;
        printf(“Inside if\n”);
}}
```

Bad indentation ☹



I feel that body of if statement is not getting executed at all!

Hmm … “Inside if” never got printed …

Sorry!

Aha!

How to debug infinite loops

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printf trick won't work if infinite loop – nothing gets printed at all!

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Avoid adventures like infinite loops if possible ☺

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```
int num = 10, i;
for(i = 1; ;){
    if(!(i = num))
        break;
    else i++;
}
```

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Temporarily restrict loop to terminate after, say 1000 iterations

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    if(!(i = num))
        break;
    else i++;
}
```

```
int num = 10, i, j = 0;
for(i = 1; j < 1000;){
    j++;
    if(!(i = num))
        break;
    else{
        i++;
        printf("At %d\n",i);
    }
}
```

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int num = 10, i;
for(i = 1; ;){
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}
```

Safest to increment this dummy counter variable j as the first statement in body

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int num = 10, i, j = 0;
for(i = 1; j < 1000;){
    j++;
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If you put j++ here, it might get skipped due to a wrong continue statement

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Once error found, remove restrictions

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int num = 10, i;
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        break;
    else i++;
}
```

```
int num = 10, i;
for(i = 1; ;){

    if(!(i == num))
        break;
    else{
        i++;

    }
}
```

Reverse the Stream

Reverse the Stream

Read 100 numbers from the input and print them back in reverse order

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int a1, a2, a3, .... ,a100;
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scanf("%d", &a100);


printf("%d", a100);
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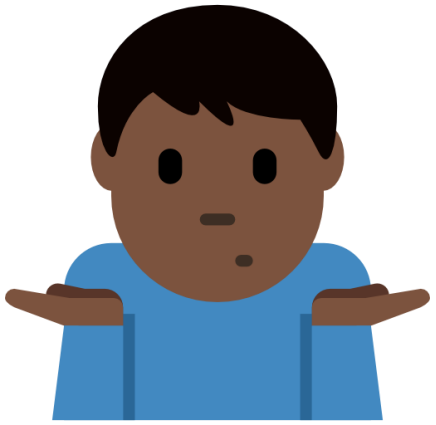

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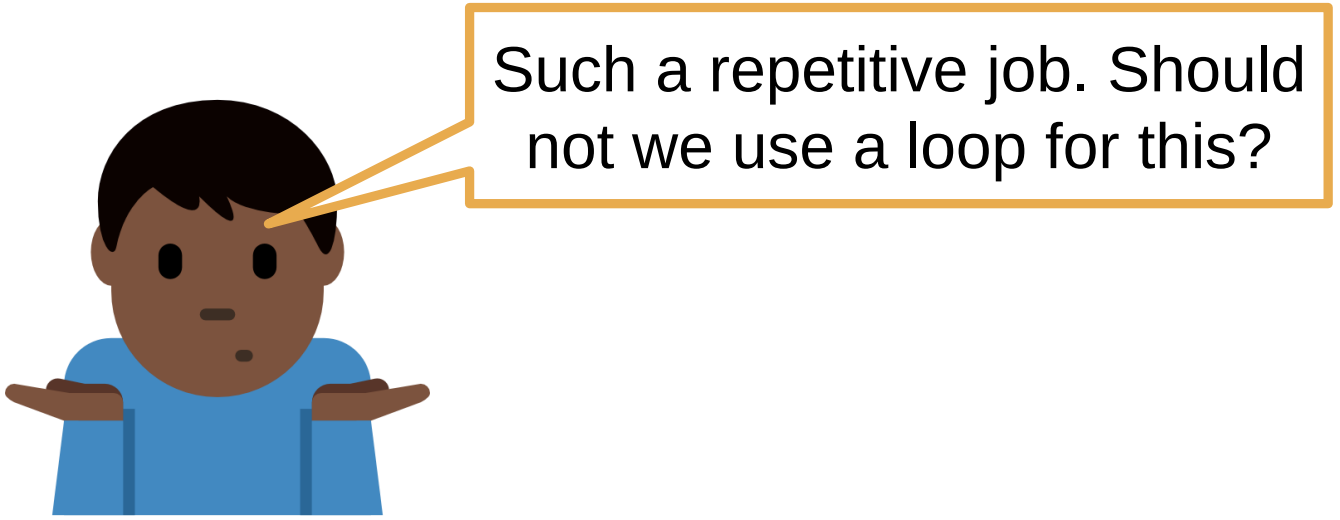

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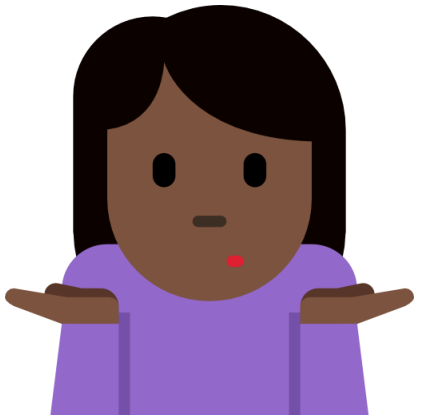

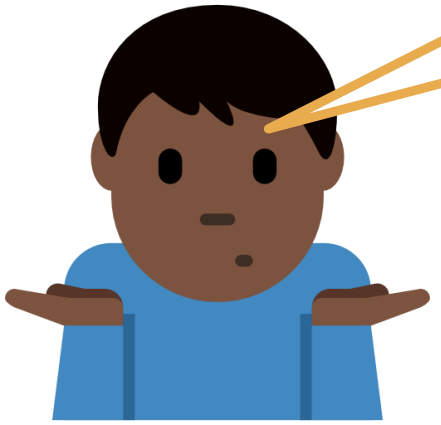

Such a repetitive job. Should not we use a loop for this?

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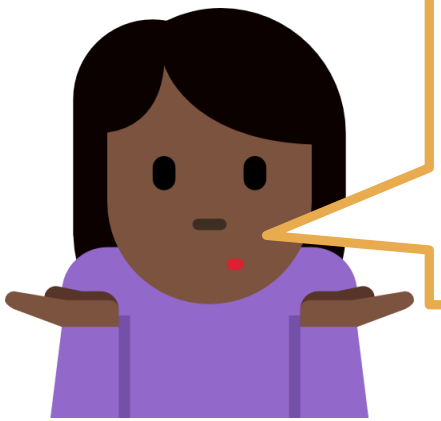

Yes but if I write
for(i = 1; i <=100; i++) scanf("%d",&a);
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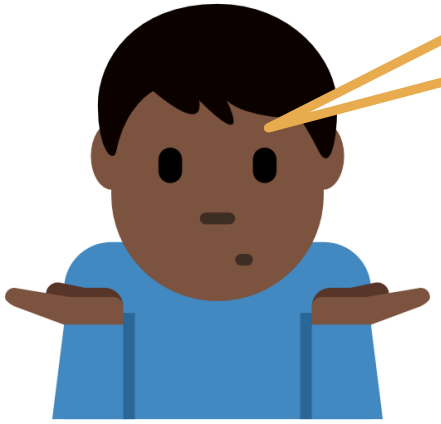

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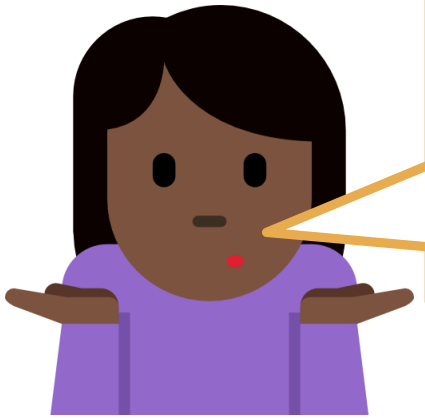

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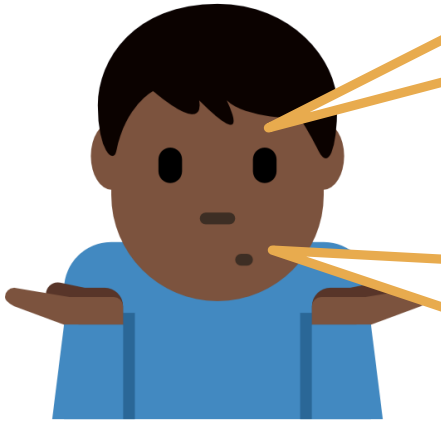

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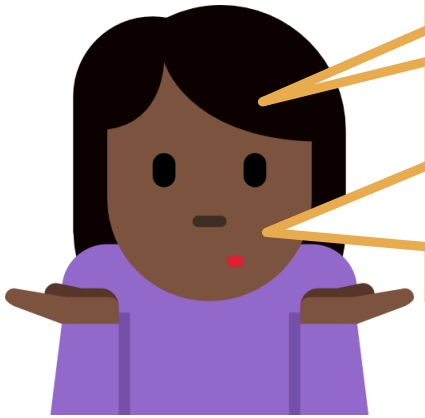

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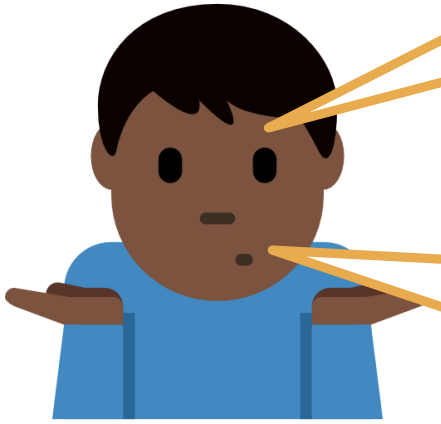

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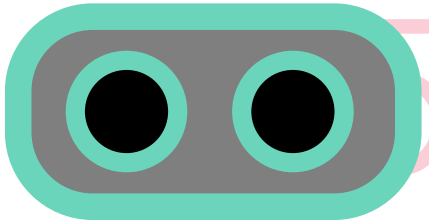

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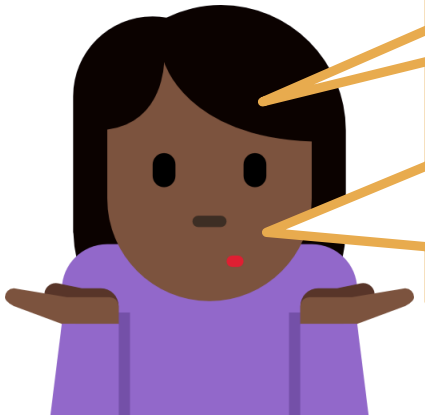

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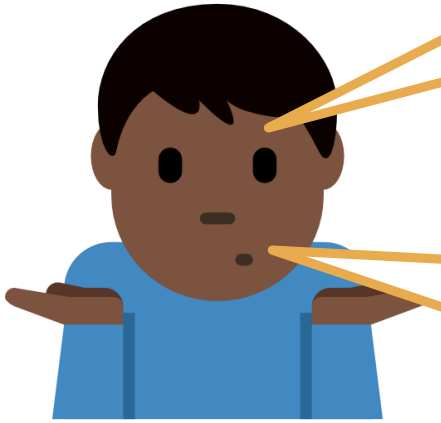

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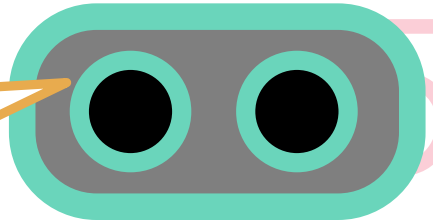

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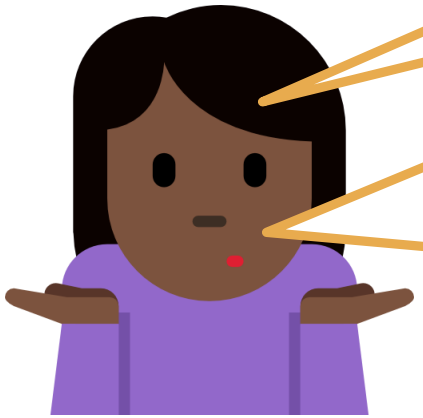

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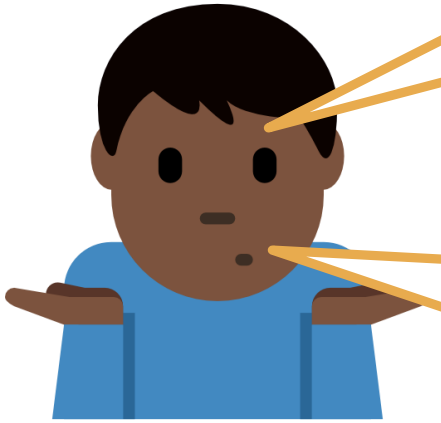

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Arrays

भारतीय प्रौद्योगिकी संस्थान कानपुर
INDIAN INSTITUTE OF TECHNOLOGY KANPUR

Arrays

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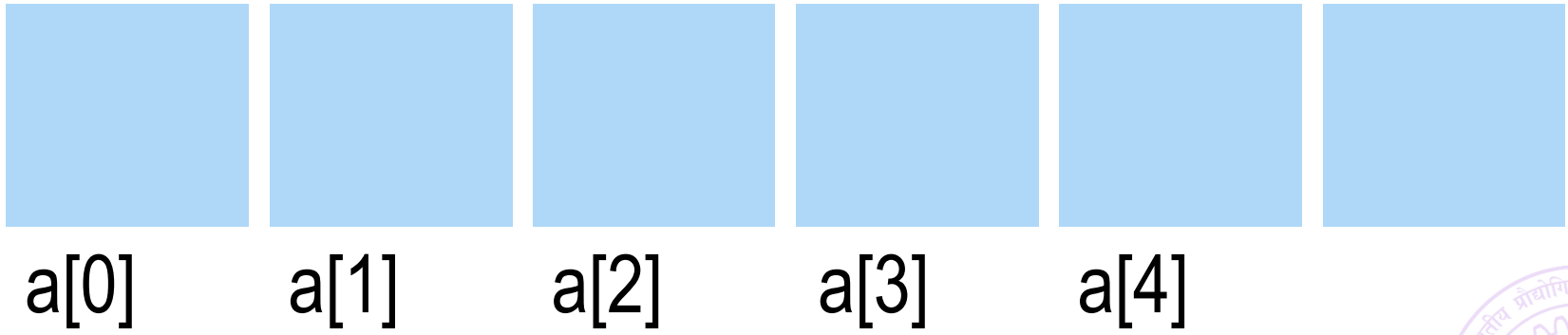

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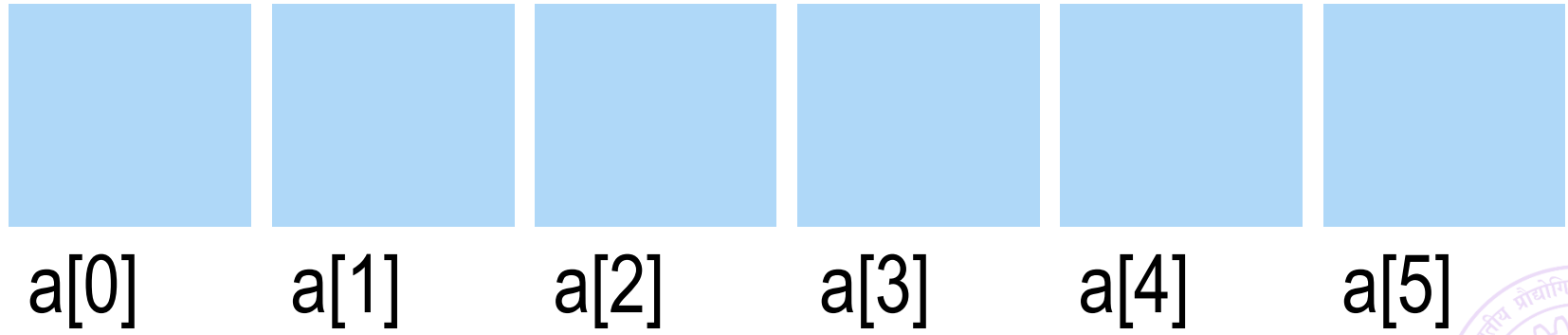

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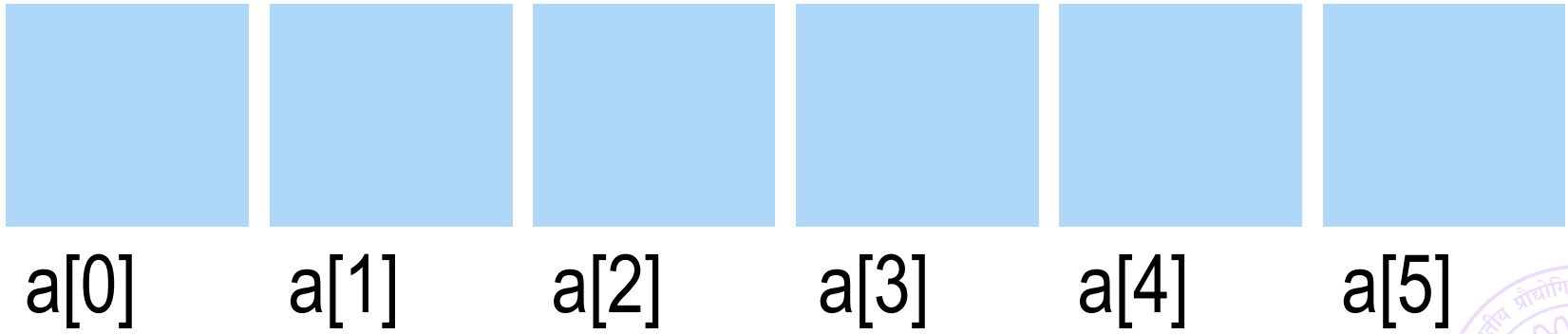

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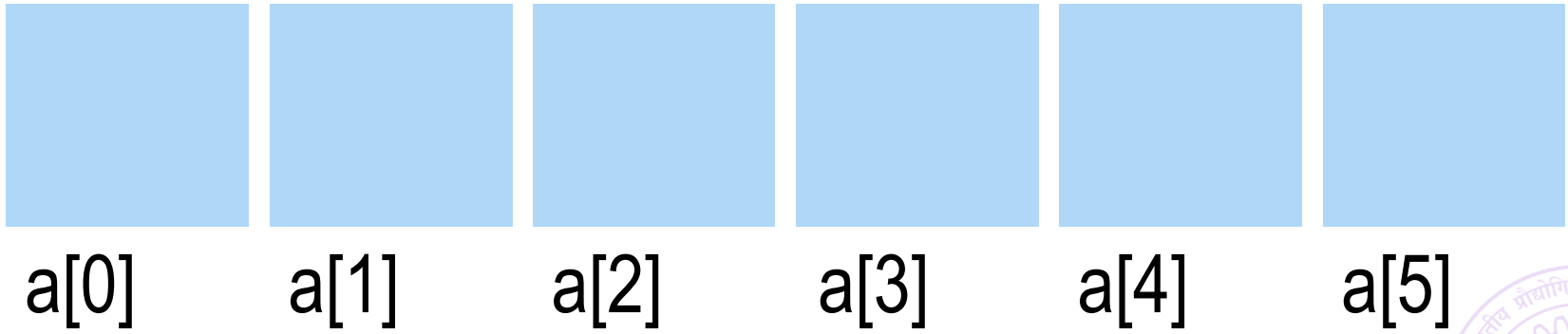
```
int a[6];
a[2] = 7;
```

a



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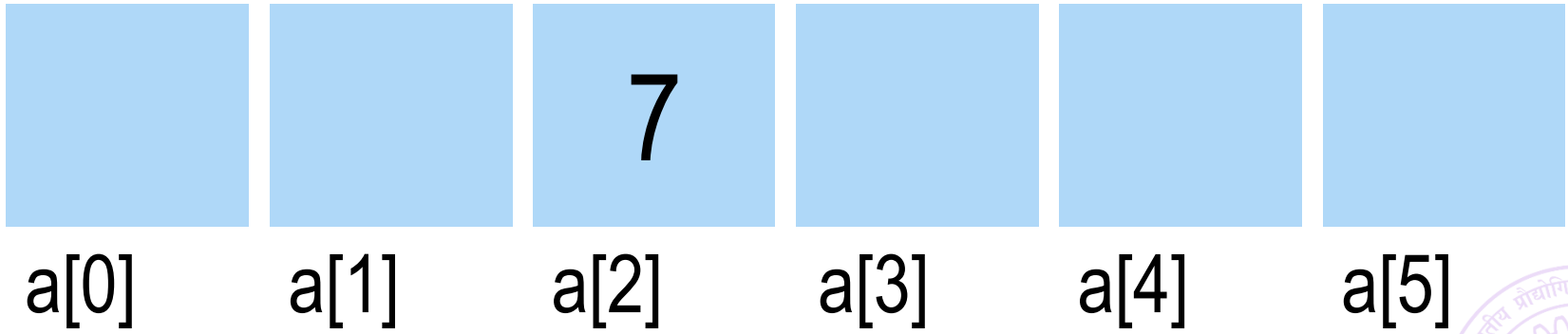

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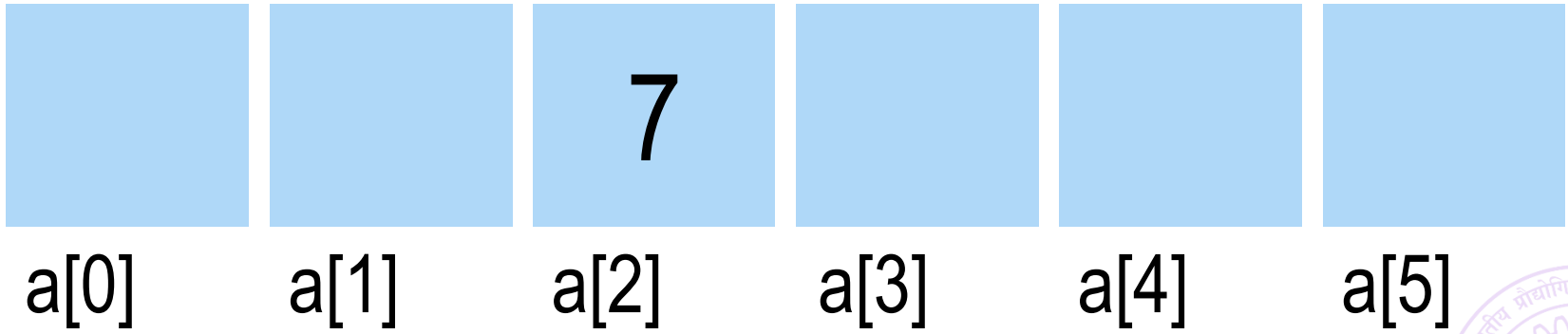
```

a



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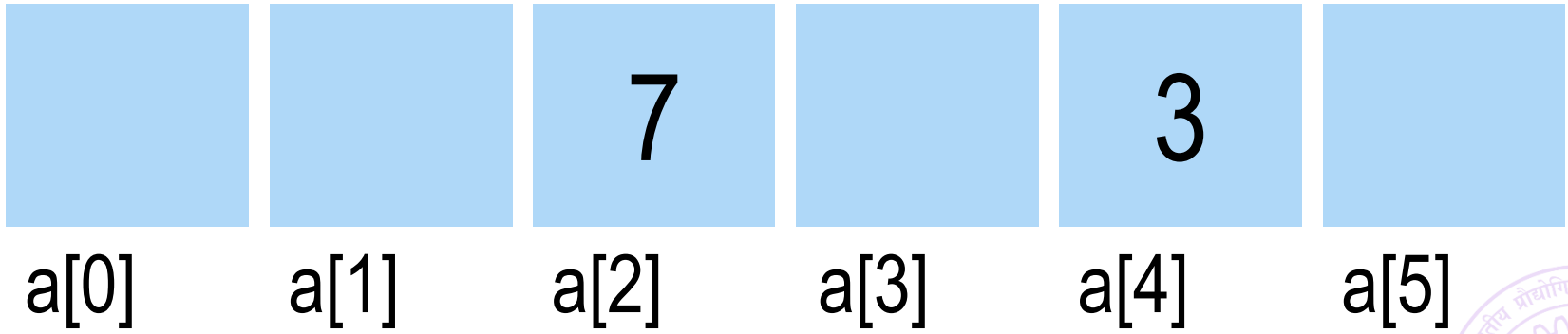

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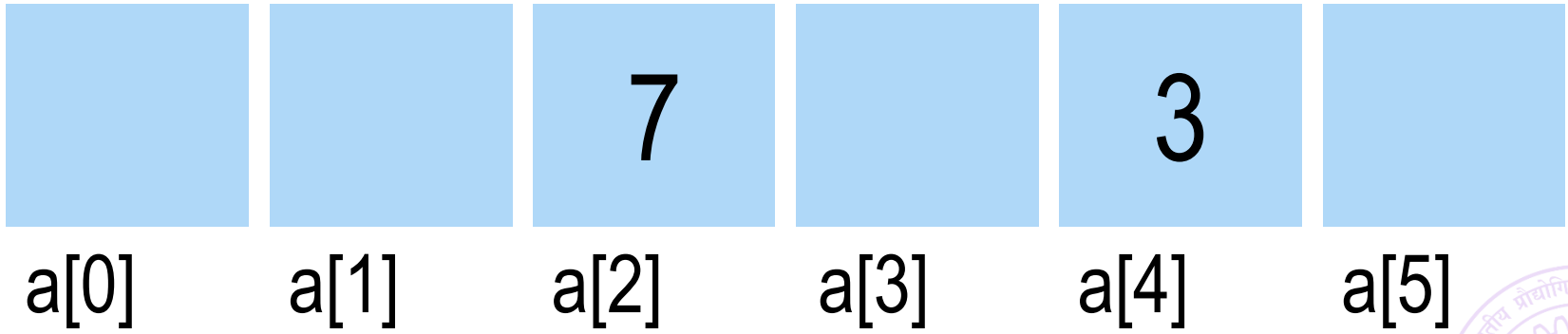

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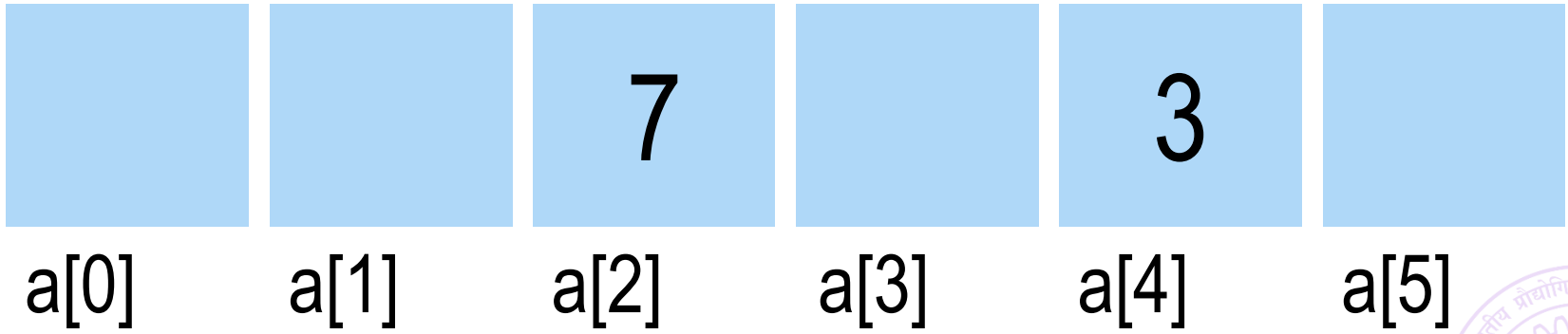

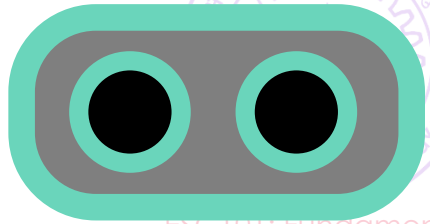

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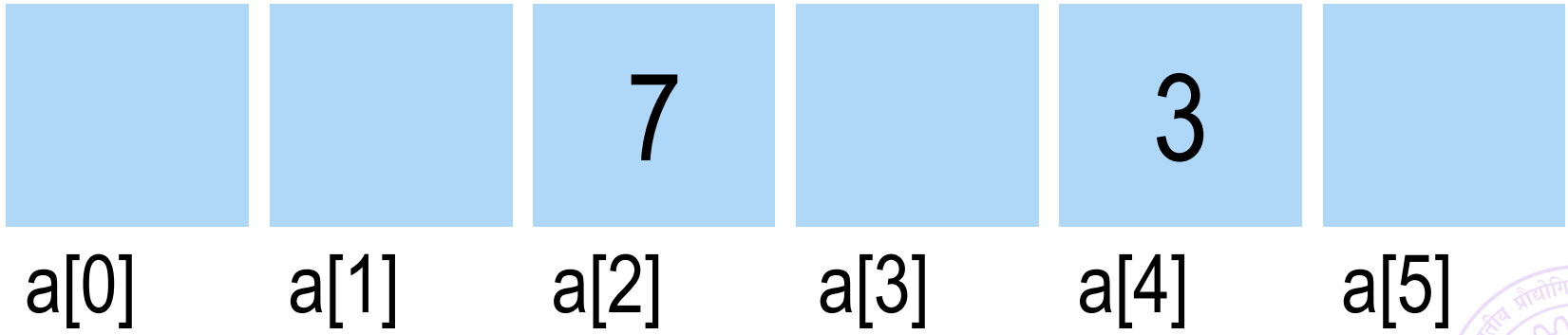

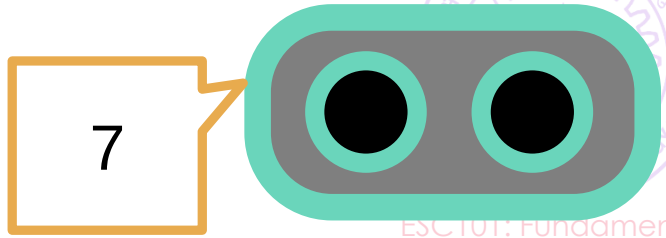

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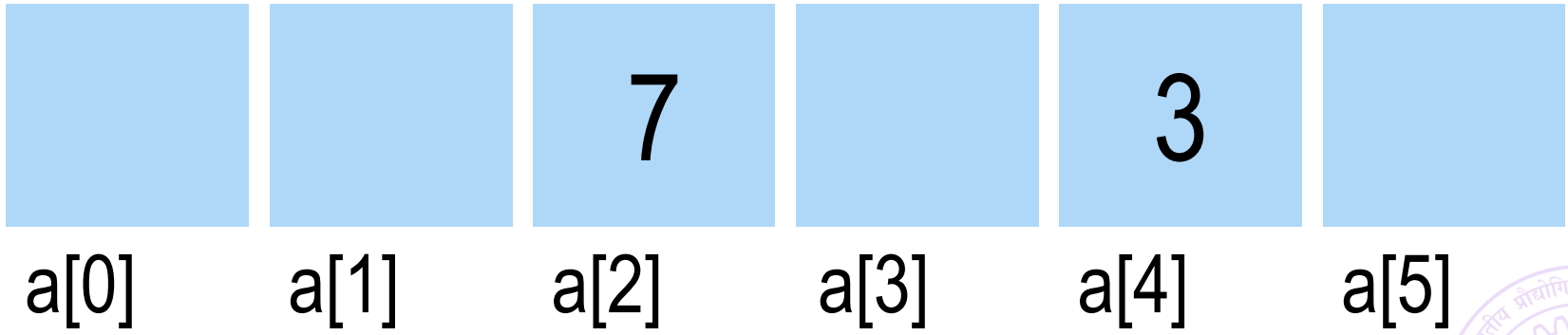
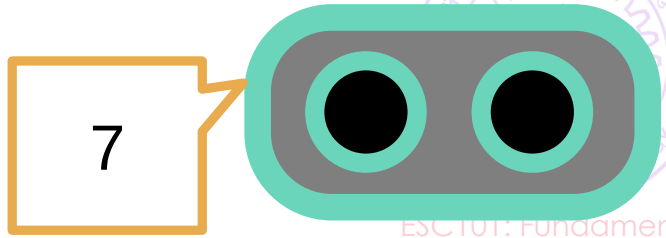


a[-1] = 6;



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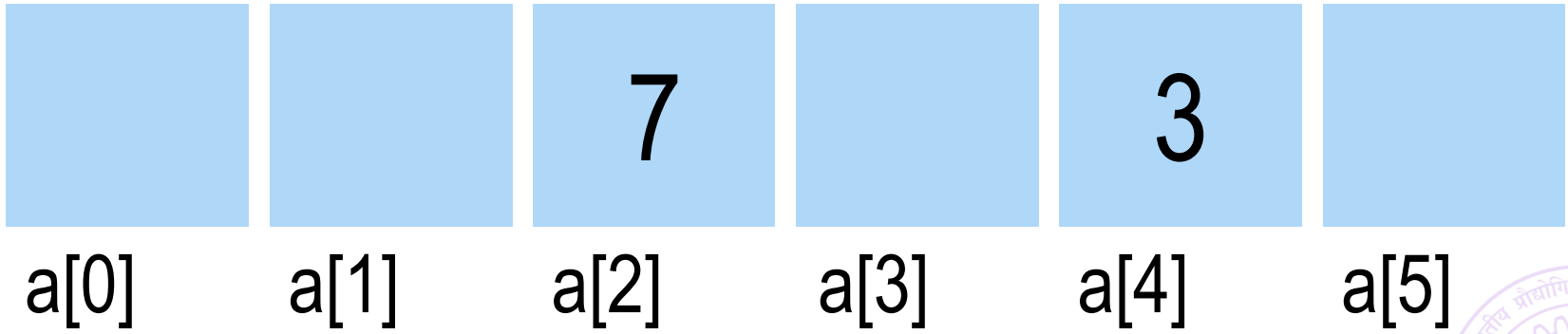
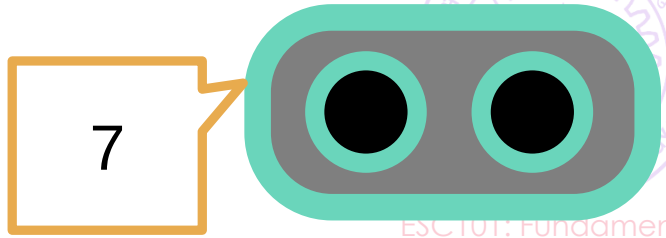


a[-1] = 6; a[6] = 4;



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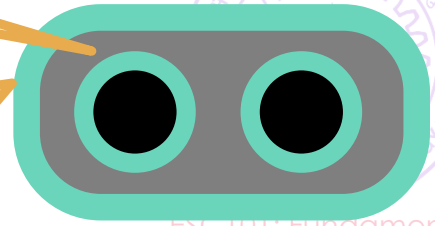
Perfect recipe for program crashes



7

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Segmentation faults

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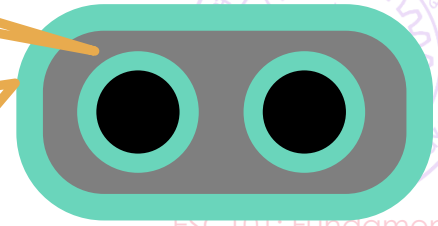
7



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I may not even give a warning when you compile

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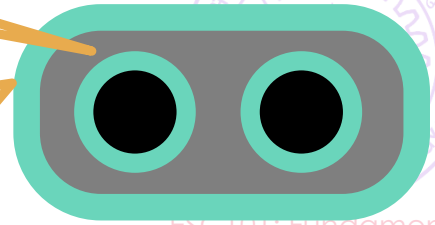
7



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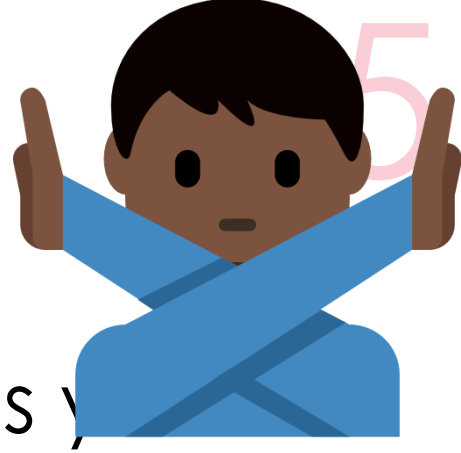


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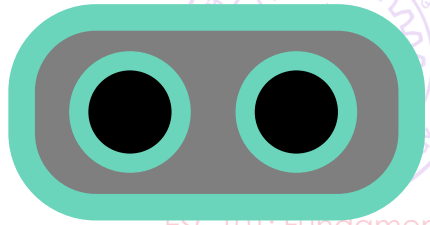

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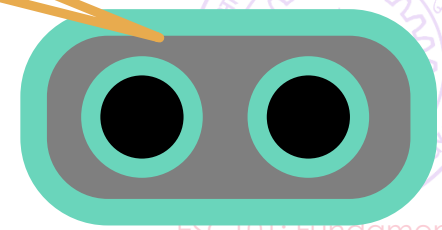

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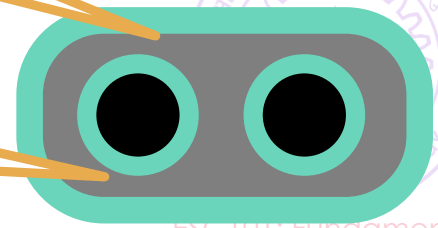
However, a[2*i+1] where i is integer perfectly fine



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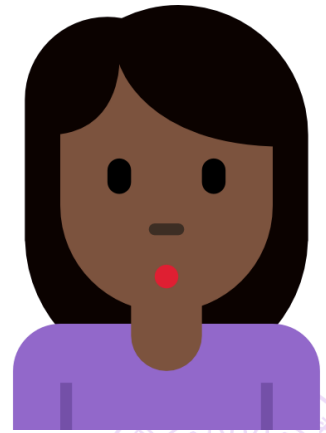

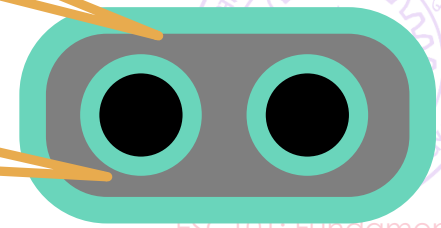

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a[int_expr] is a perfect way to refer to elements of array a if int_expr is an expression that takes integer values.

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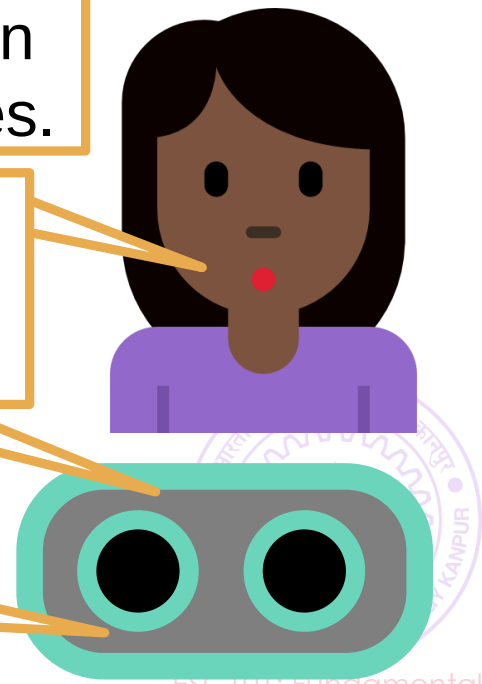

BODMAS table has more members

Operator Name	Symbol/Sign	Associativity
Brackets (**array subscript**), Post increment/decrement	(), **[]** ++, --	Left
Unary negation, Pre increment/decrement, NOT	-, ++, --, !	Right
Multiplication/division/ remainder	*, /, %	Left
Addition/subtraction	+, -	Left
Relational	<, <=, >, >=	Left
Relational	==, !=	Left
AND	&&	Left
OR	||	Left
Ternary Conditional	? :	Right
Assignment, Compound assignment	=, +=, -=, *=, /=, %=	Right

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HIGH PRECEDENCE

LOW PRECEDENCE

Reading Array elements

Reading Array elements

Two ways

Reading Array elements

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Read into an integer and then transfer into array

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int a[6], temp;
scanf("%d", &temp);
a[2] = temp;
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Precedence rules force &a[2] to be interpreted by Mr C as &(a[2]) and not as (&a)[2]