Mr. C doesn’t get bored

ESC101: Fundamentals of Computing

Purushottam Kar

Announcements - Quiz

- Major quiz **this** week – (syllabus till **Friday Aug 24**)
  - Wednesday, August 29, 2018, 12PM-12:50PM, L20 (i.e. lecture hour)
  - During lecture hours – don't be absent
  - **Bring your institute ID card** with you – will lose time if you forget
  - No minor quizzes during lab this week (August 27-August 30)
- Bring a **pencil, eraser and sharpener** with you
  - Answers to be written on question paper itself and returned back
  - If you make a mistake with pen – no extra question papers
  - If unsure, **first write answer with pencil** and **finally write it in pen**
  - We WONT HAVE EXTRA QUESTION PAPERS in case you spoil yours
  - We WONT HAVE PENCILS, ERASERS in case you forget

Announcements - Grade

- Minor quiz for week 2 has been graded
  - Marks have been uploaded to Gradescope
  - You would have received an email inviting you to join Gradescope
  - In case of issues, please ask us during your lab this week
- Minor quiz has been autograded
  - No "grace" marks – negative penalty for useless regrading requests
  - Yesterday, someone awarded -2 marks for such a regrading request
- If you cannot see your minor quiz on Gradescope
  - You gave your minor quiz on pen-paper – please wait for a day
  - You gave the wrong secret code (someone wrote their mobile no ☺)
  - Contact us over Piazza (private message) if you feel something wrong

Announcements - Holiday

- Institute holiday next Monday (03 September, 2018)
- No lecture, no lab on that day
- Extra lecture on Saturday 08 September, 2018
  - 12 noon, L20 (same as usual)
  - Scheduled by DoAA, not by me – I like to sleep on Sat too ☹
- Extra lab for B1, B2, B3 on Saturday 08 September
  - 2PM – 5PM, New Core Labs CC-02 (same as usual)

Announcements - Exam

- Mid-sem lab exam on 09 September, 2018 (Sunday)
- Will give details of the same very soon
- Please do not go on holiday or travel – no make up!

Humans vs Mr. C

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- Humans get bored and tired easily

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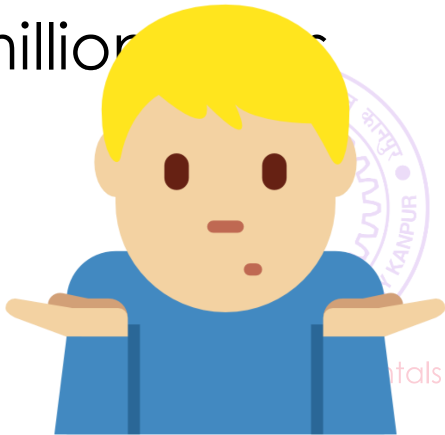

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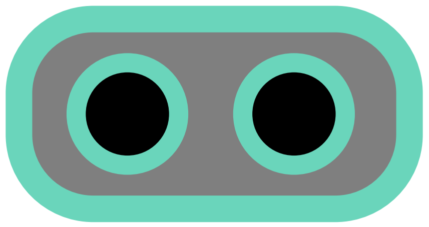

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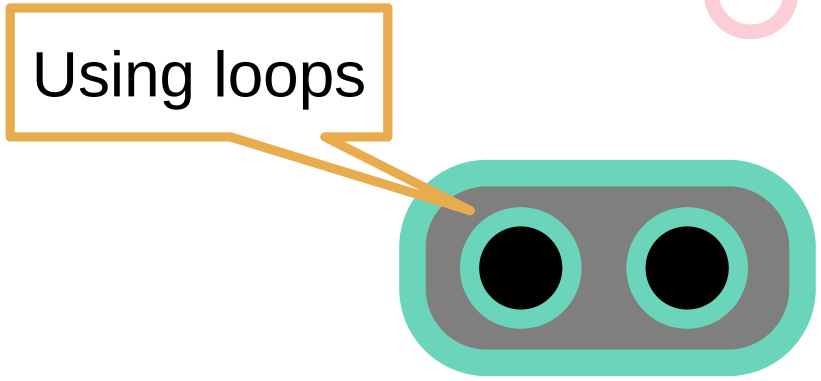

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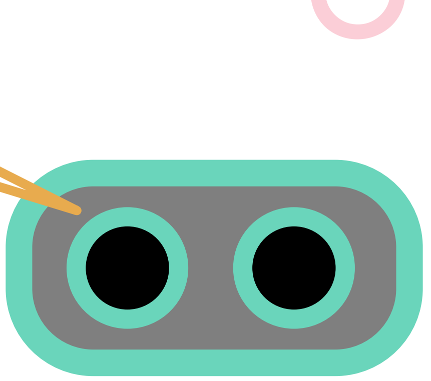

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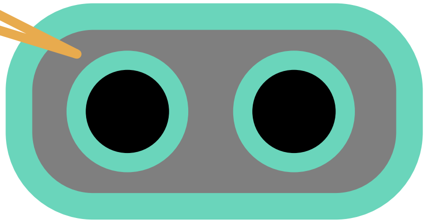
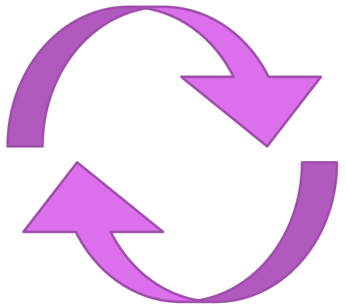
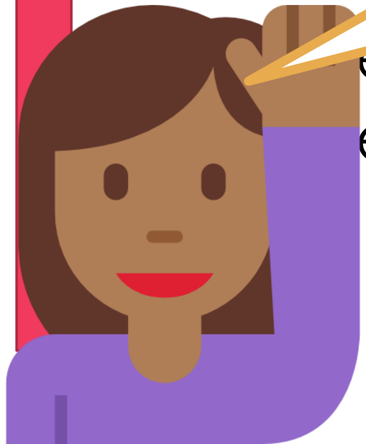
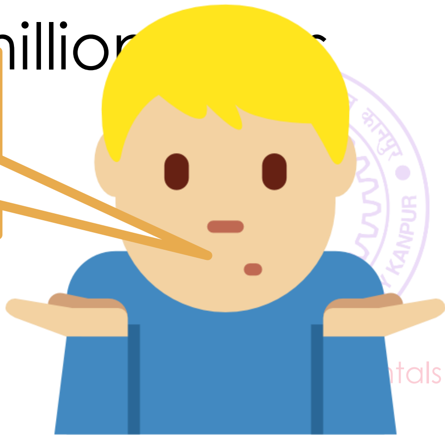



The English word “loop” means something that goes round and round. Is there a connection?





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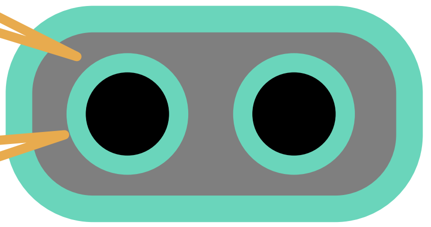
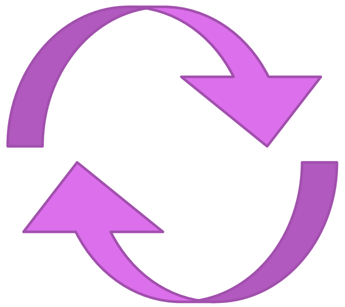

Using loops
Yes. I keep executing a set of tasks that you give me again and again till you ask me to stop



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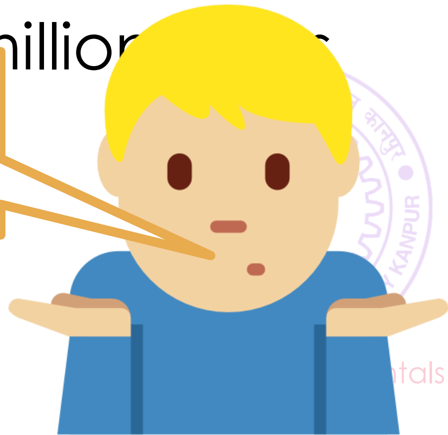

Printing the multiplication table of 2

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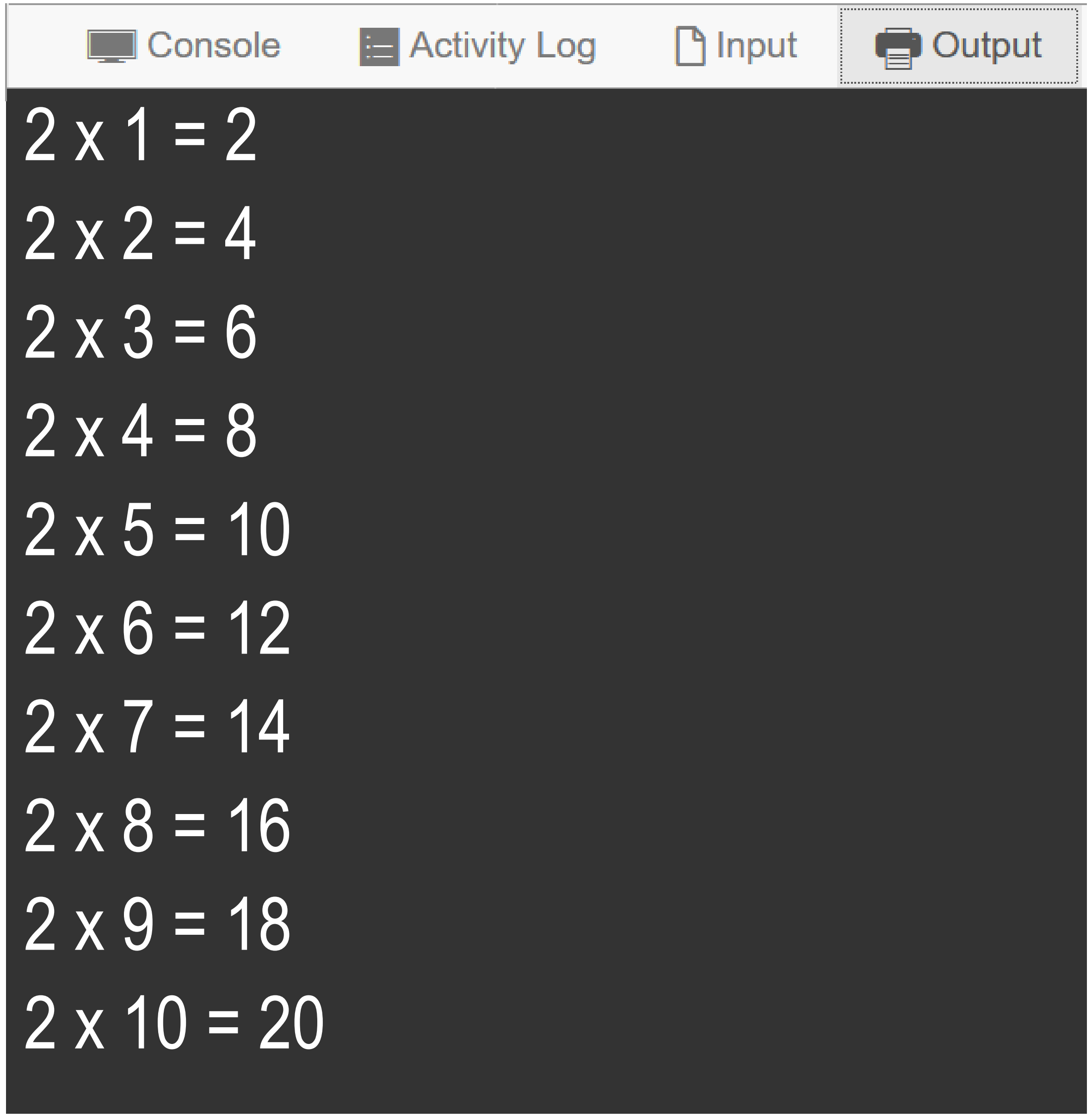

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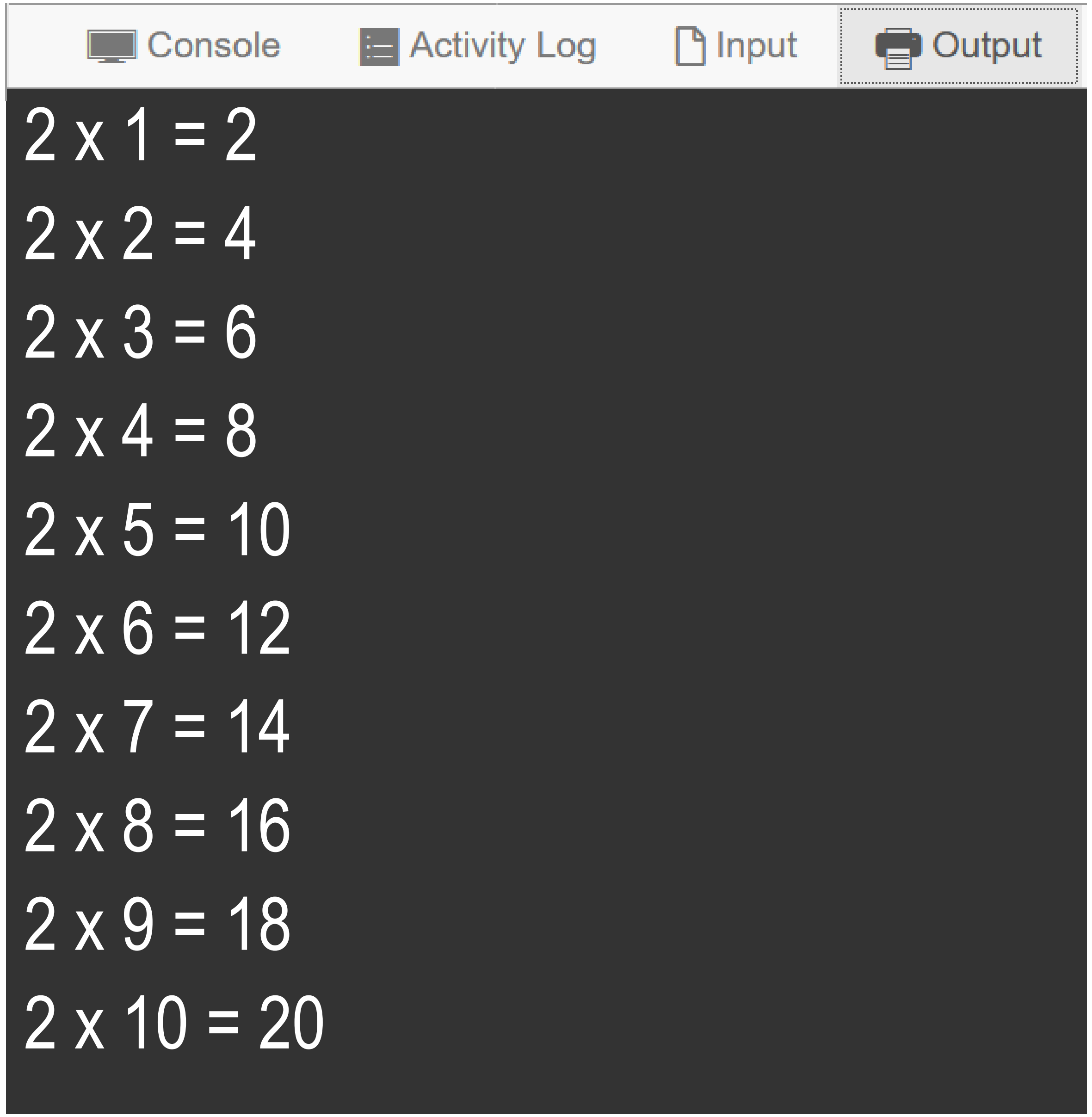

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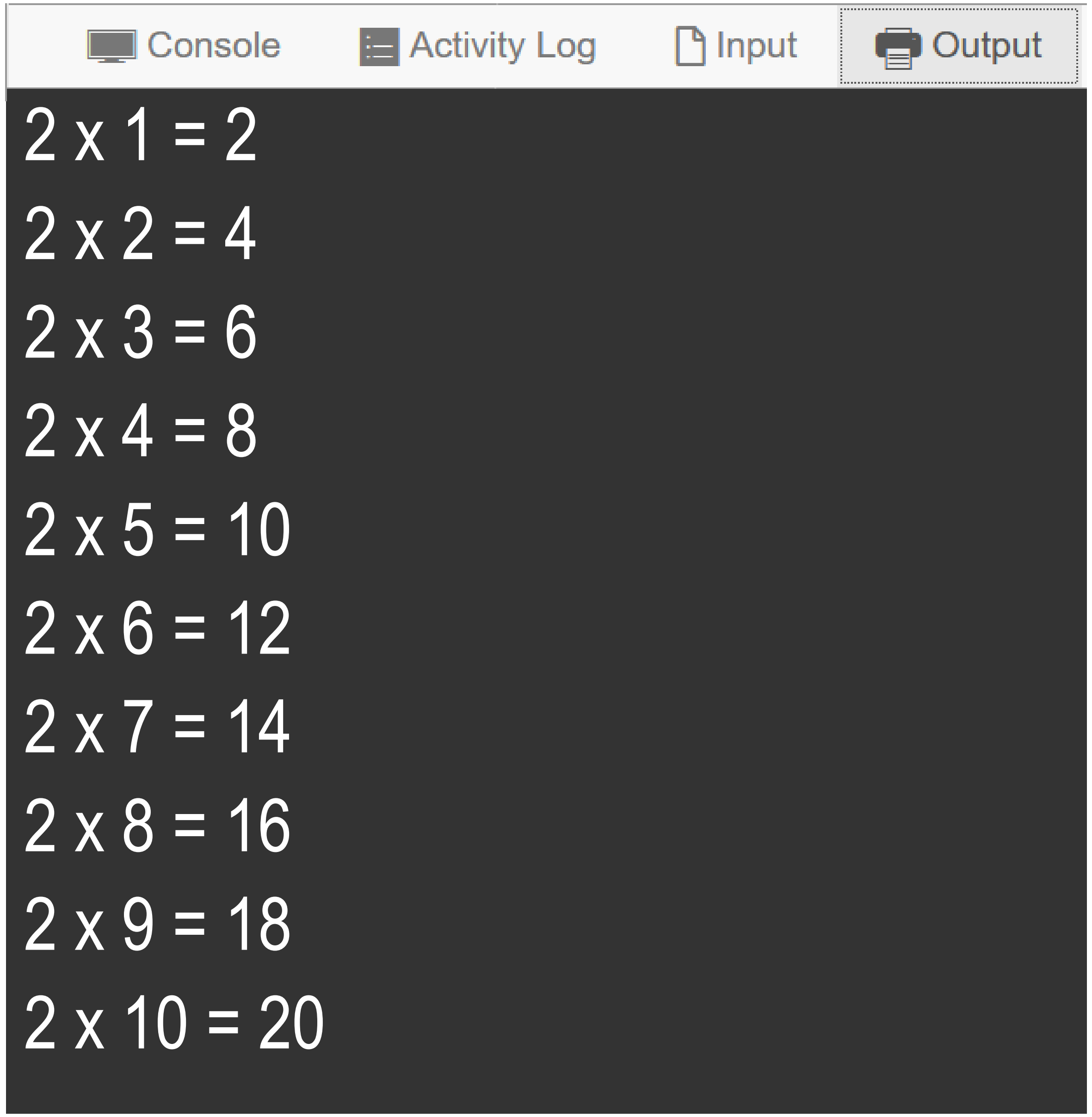

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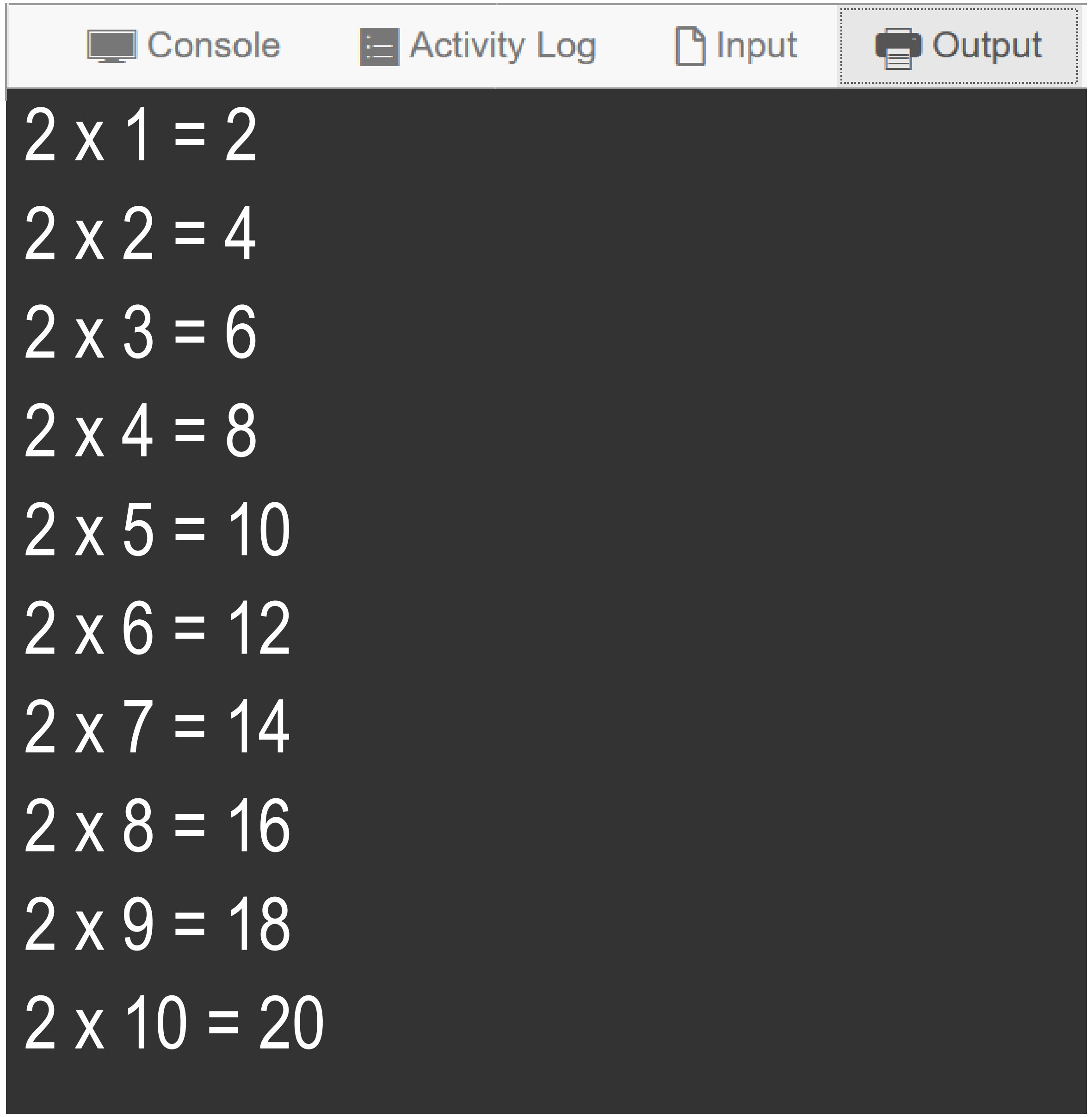

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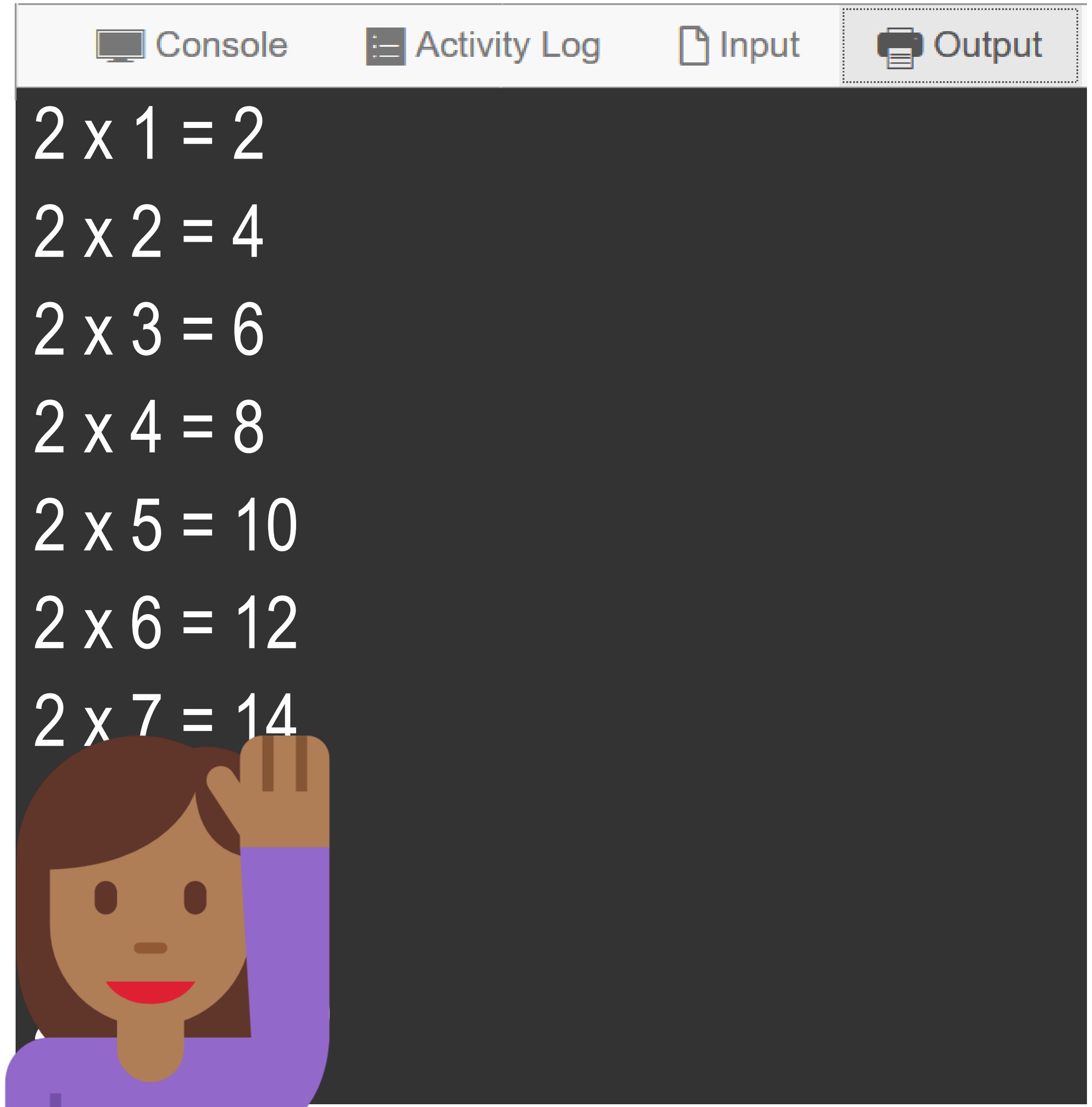

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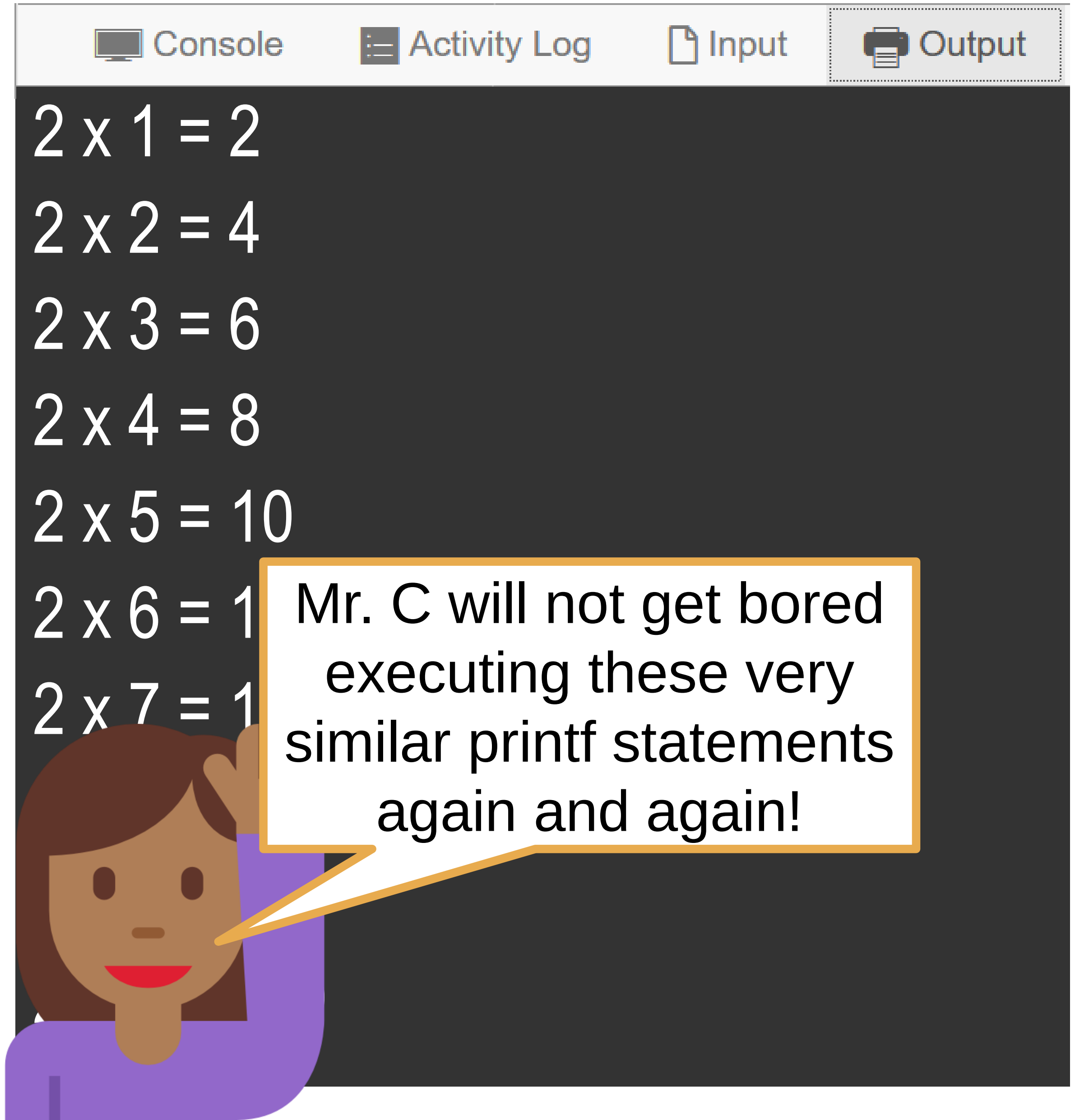
Console
Activity Log
Input
Output
Mr. C will not get bored executing these very similar printf statements again and again!

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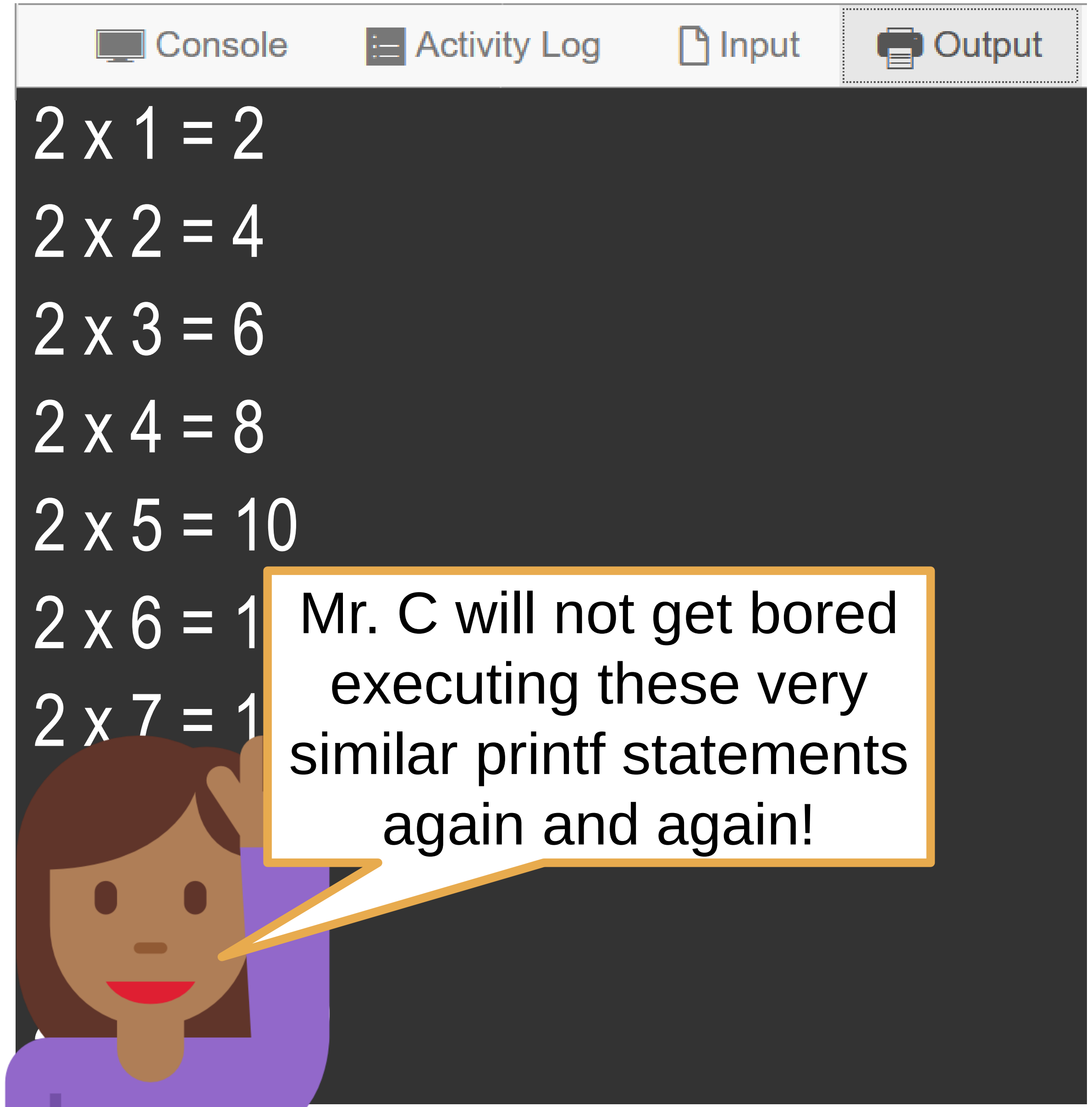

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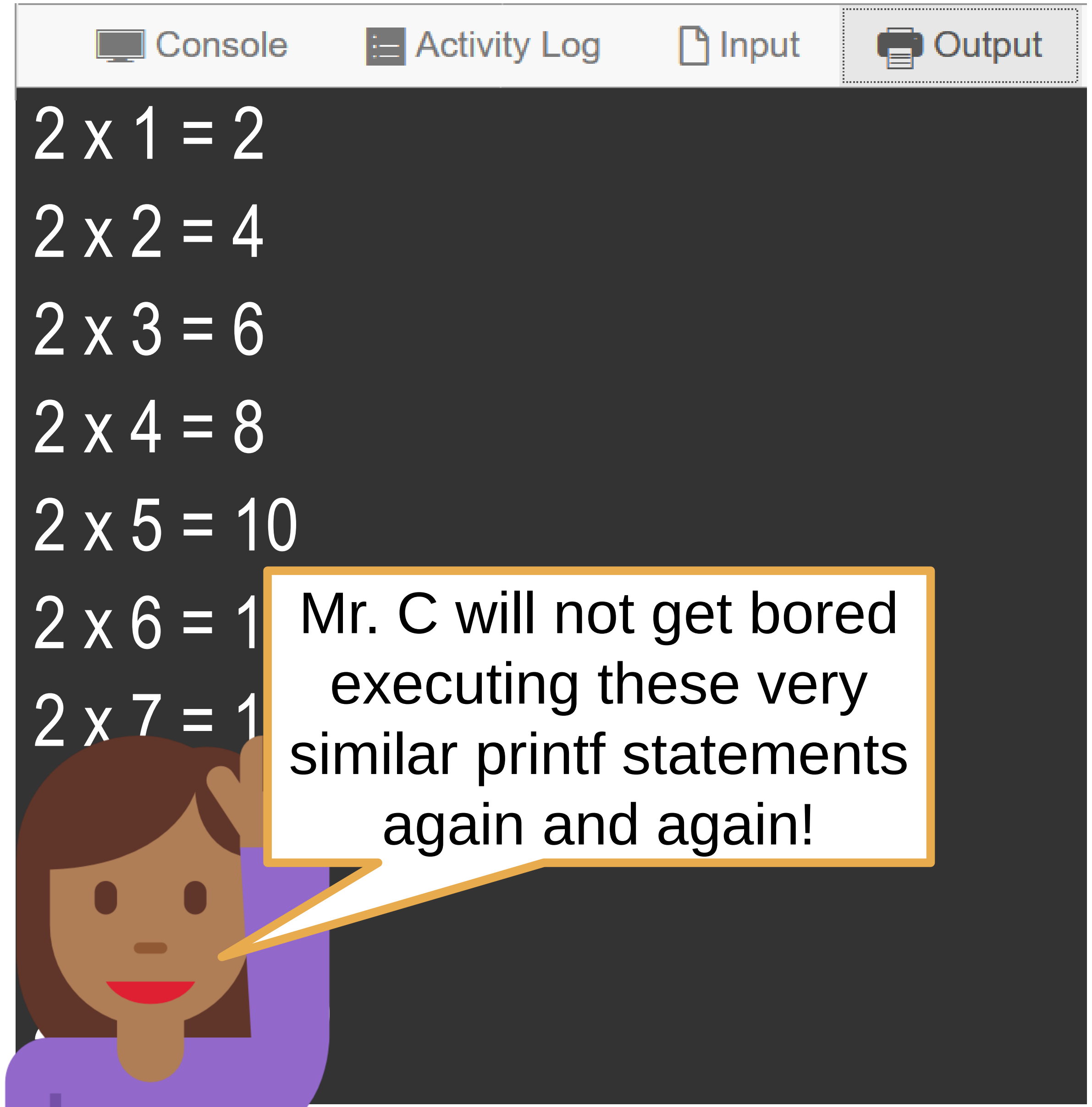

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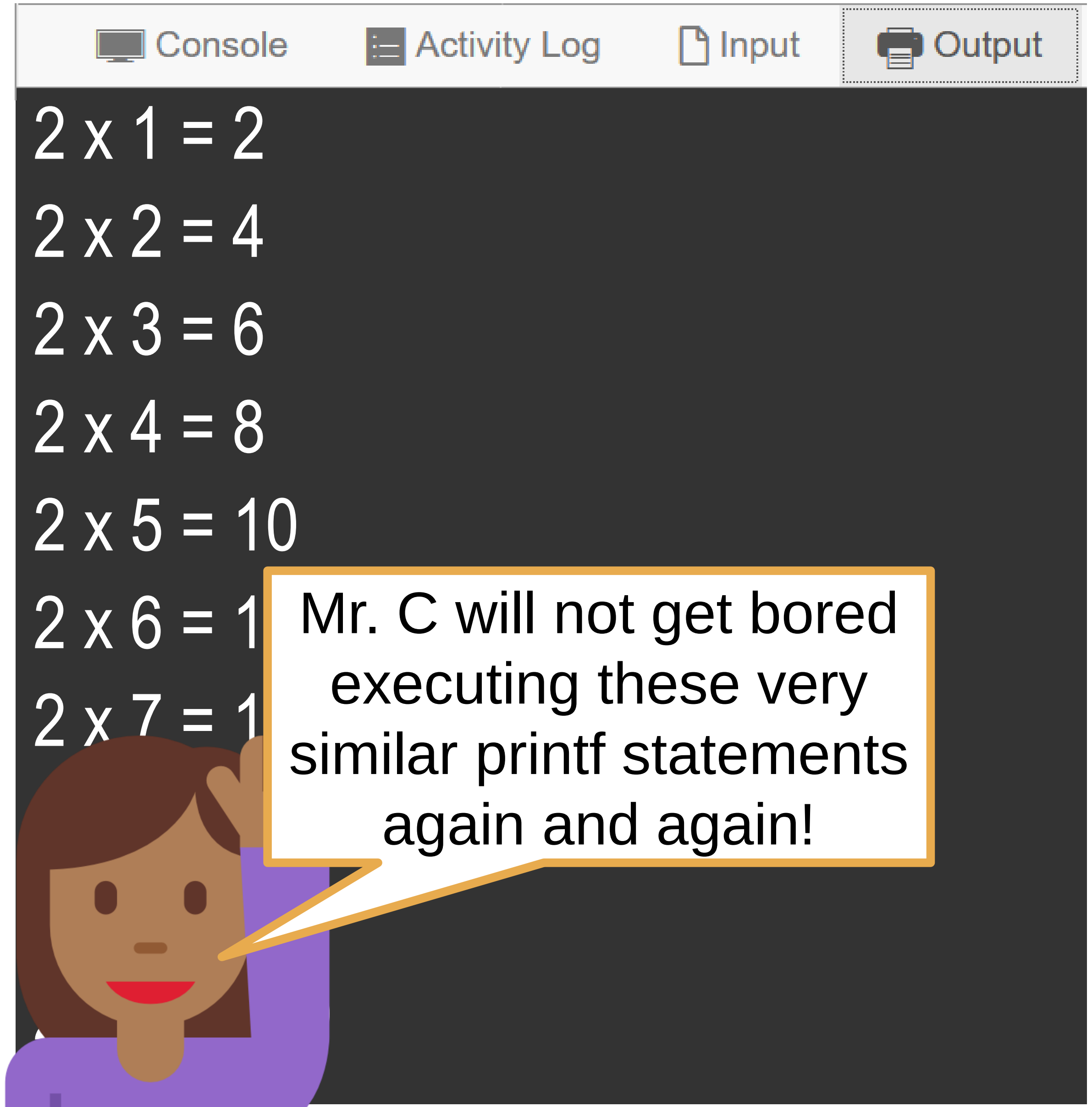

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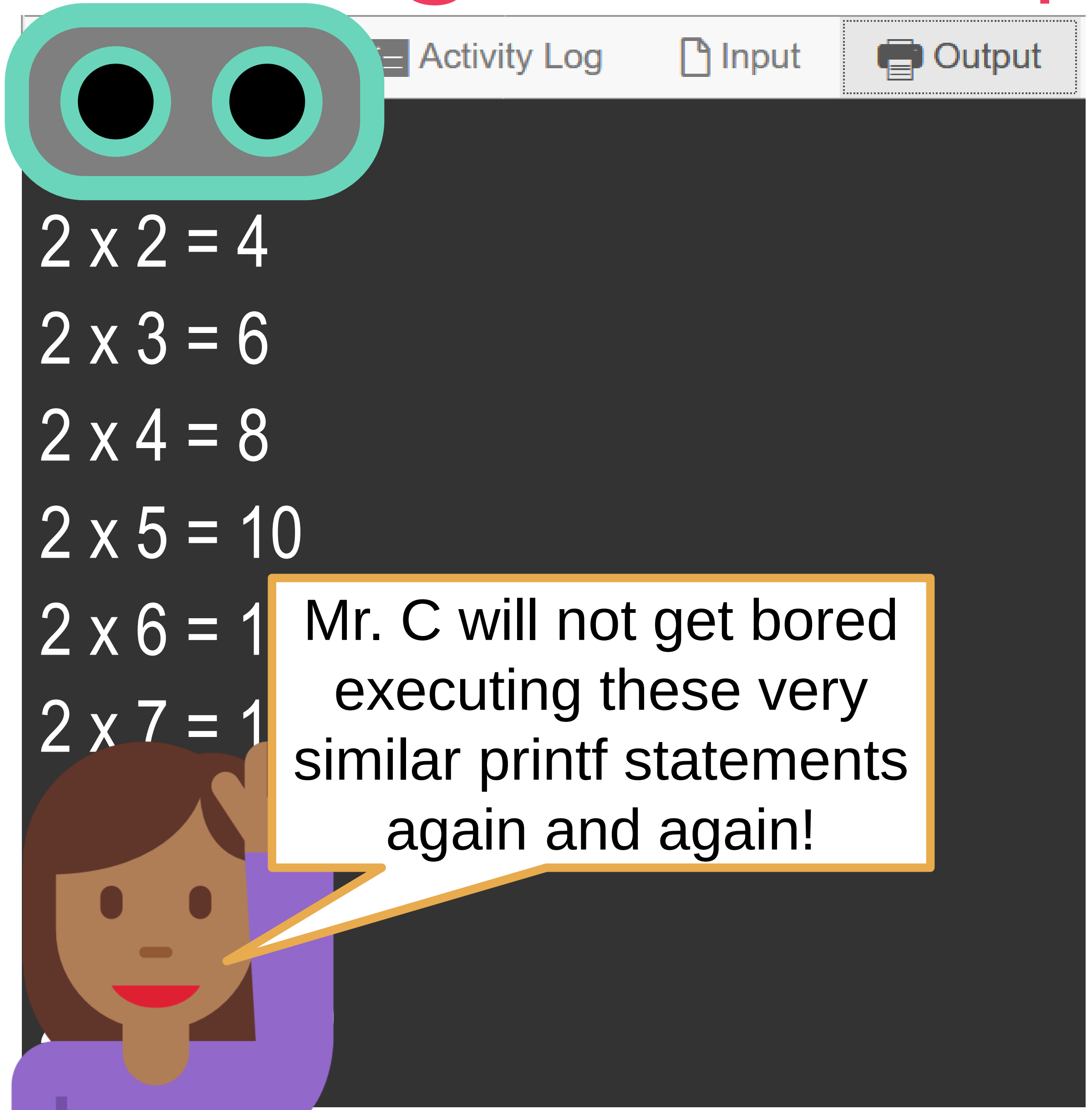

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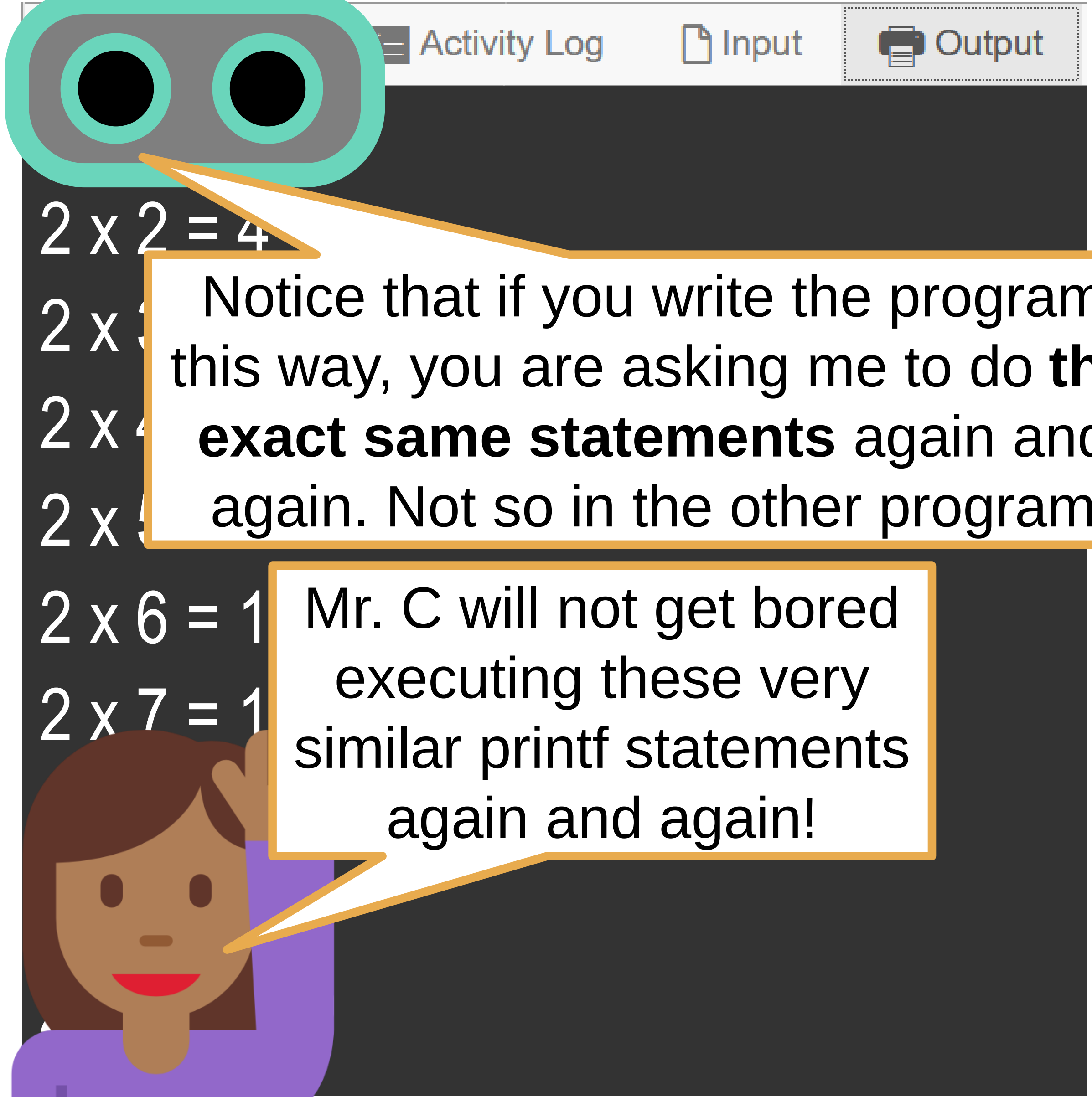

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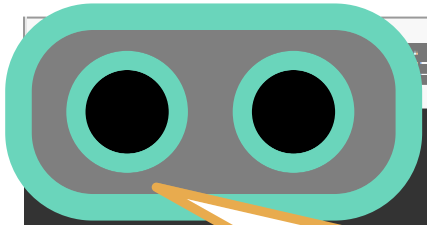

Notice that if you write the program this way, you are asking me to do **the exact same statements** again and again. Not so in the other program

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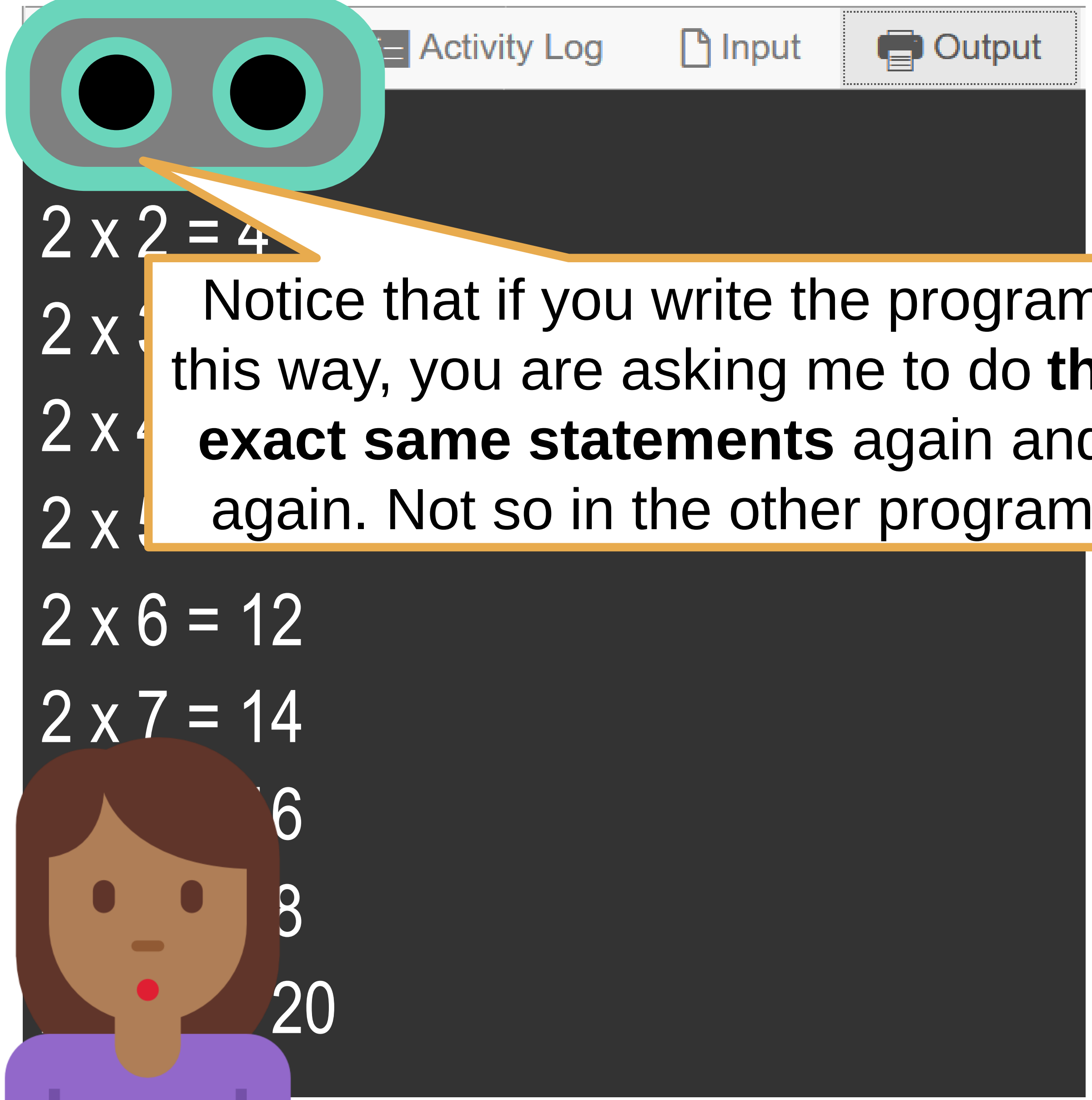

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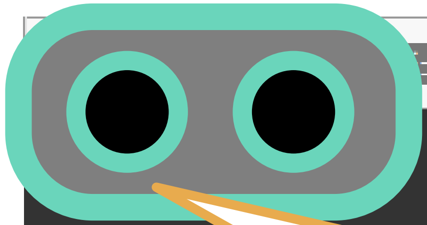

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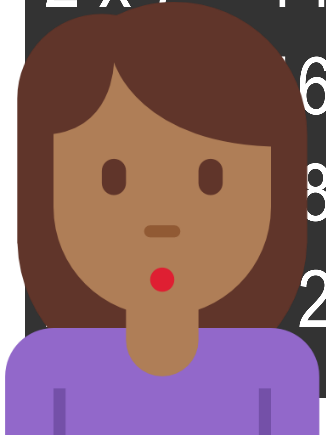

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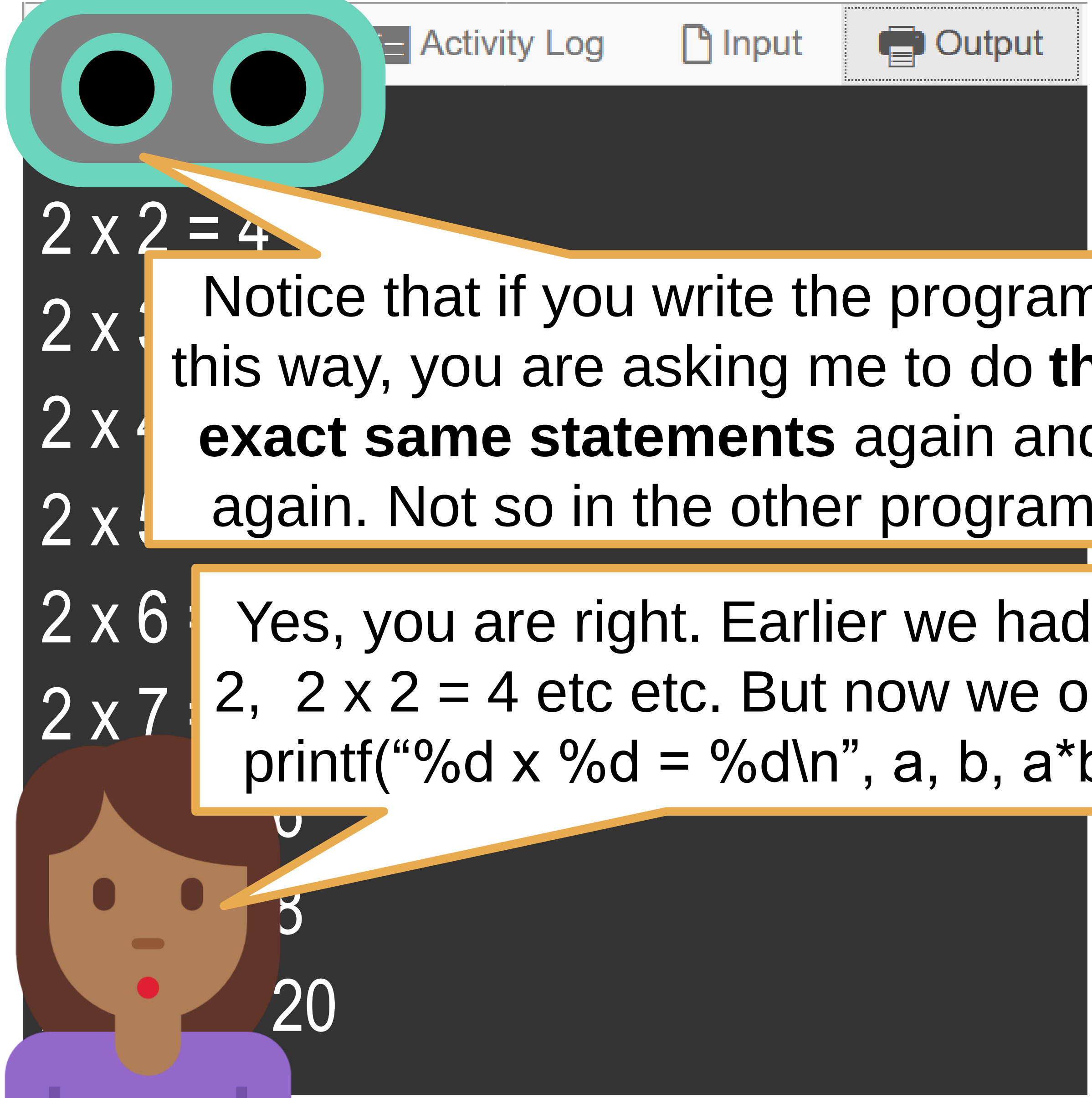

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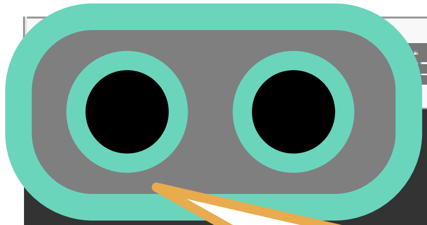

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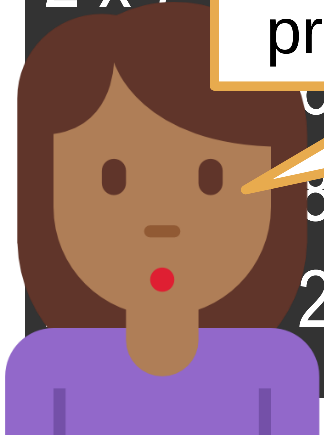

Yes, you are right. Earlier we had 2 x 1 = 2, 2 x 2 = 4 etc etc. But now we only have printf(“%d x %d = %d\n”, a, b, a*b); b++;

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printf(“%d x %d = %d\n”, a, b, a*b);
b++;
printf(“%d x %d = %d\n”, a, b, a*b);
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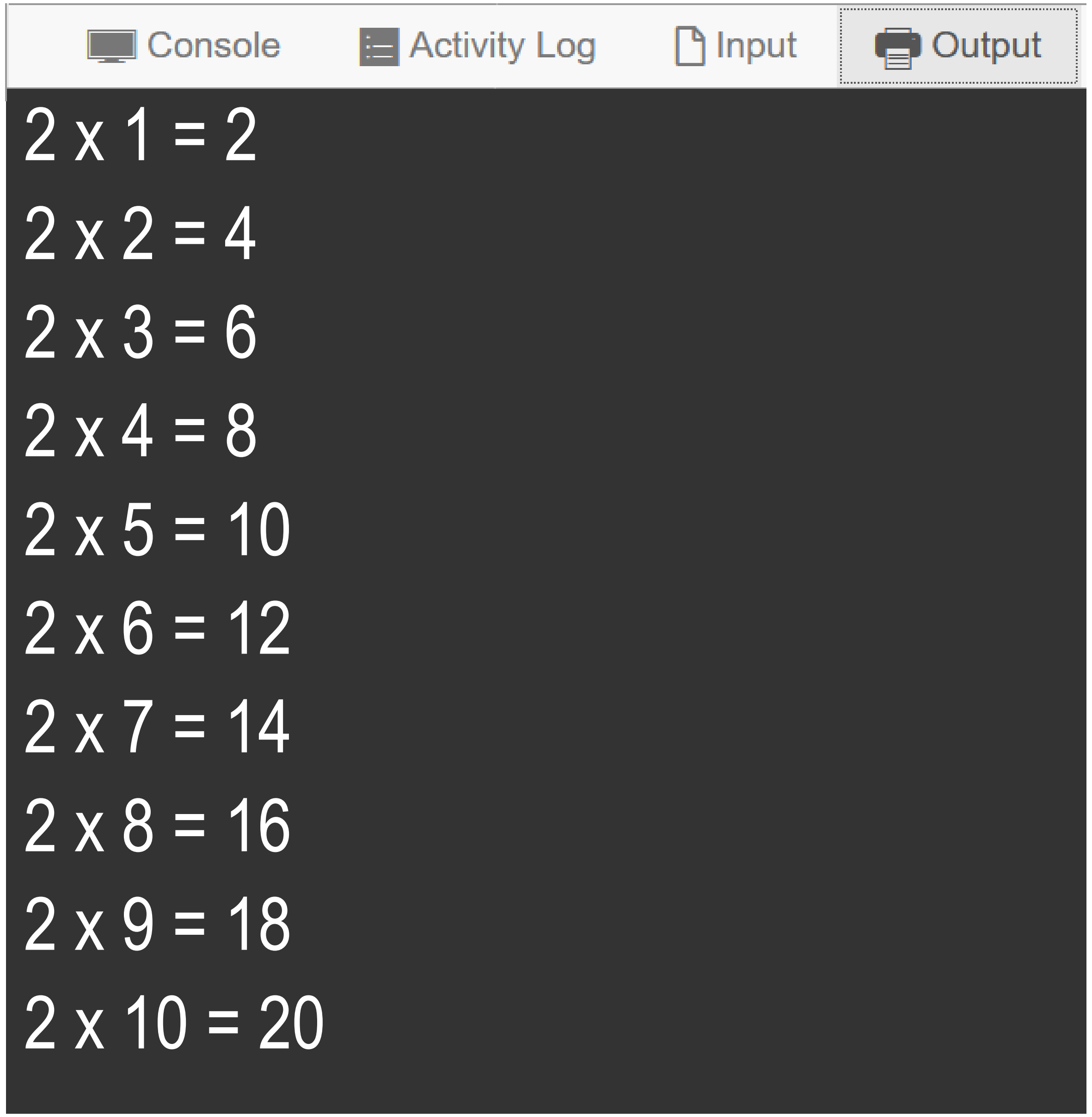

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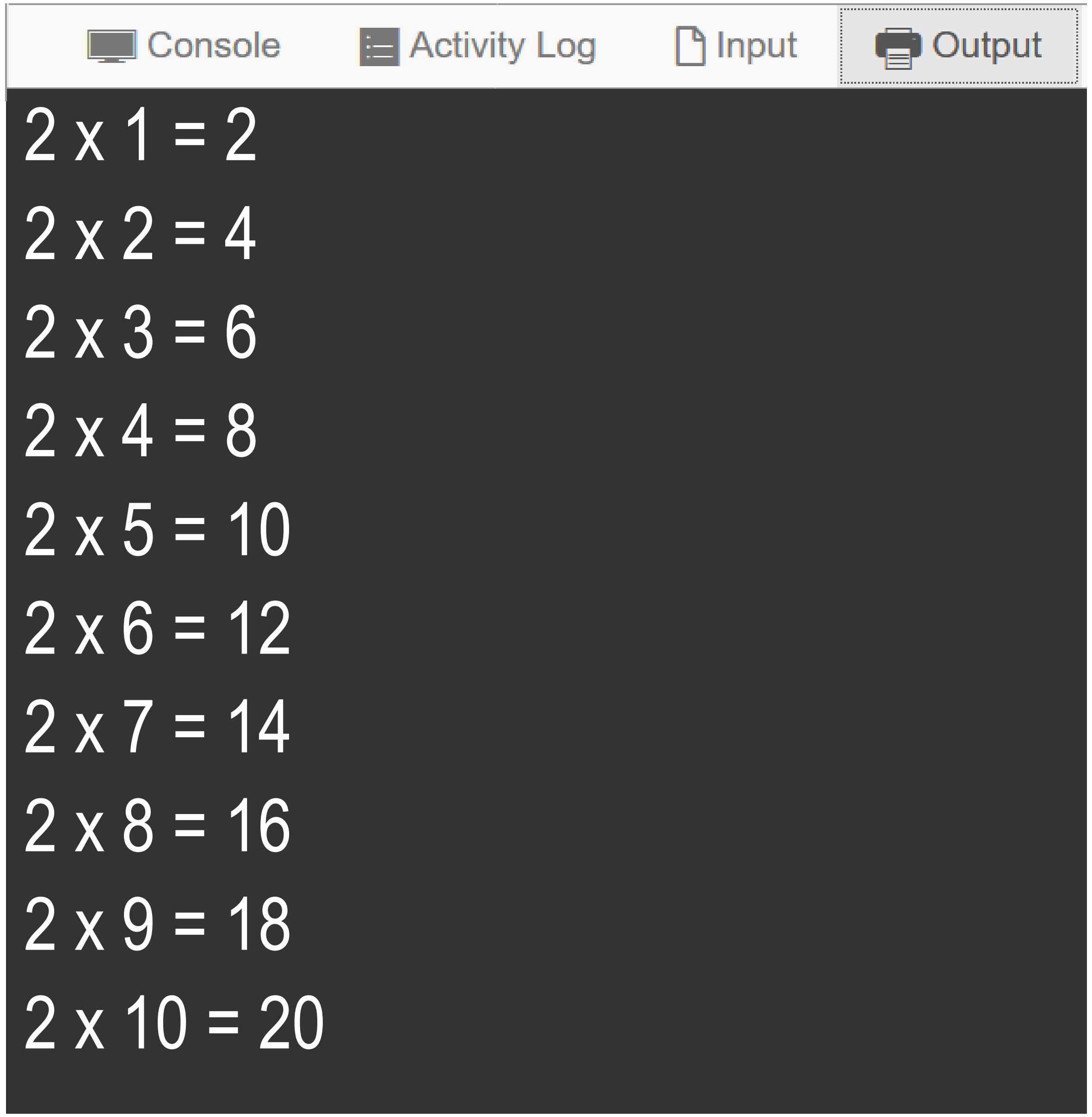
Printing the multiplication table of 2



```
2 x 1 = 2
2 x 2 = 4
2 x 3 = 6
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2 x 5 = 10
2 x 6 = 12
2 x 7 = 14
2 x 8 = 16
2 x 9 = 18
2 x 10 = 20
```

```c
int a = 2, b;
for(b = 1; b <= 10; b++){
    printf("%d x %d = %d\n", a, b, a*b);
}
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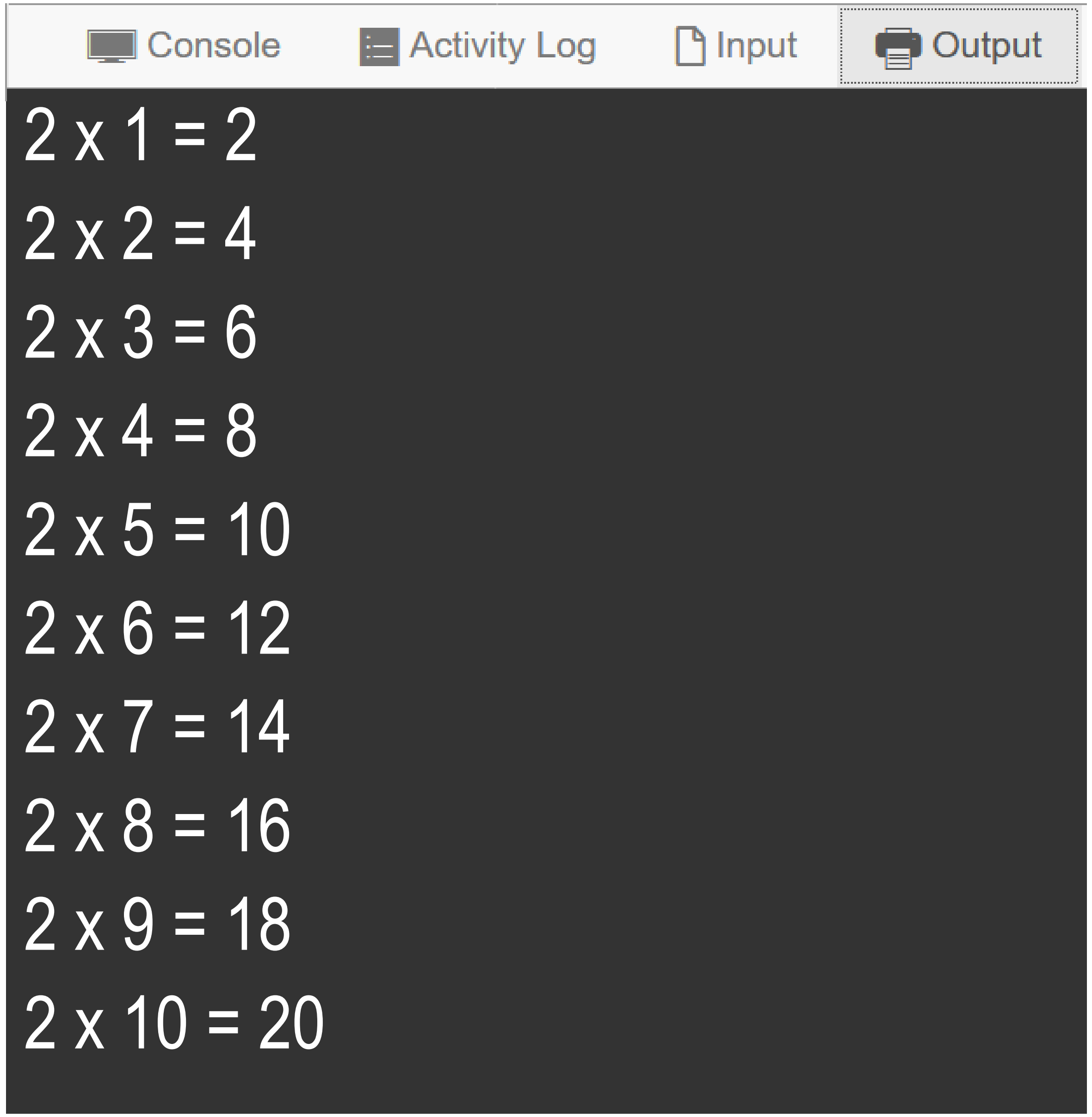
Printing the multiplication table of 2



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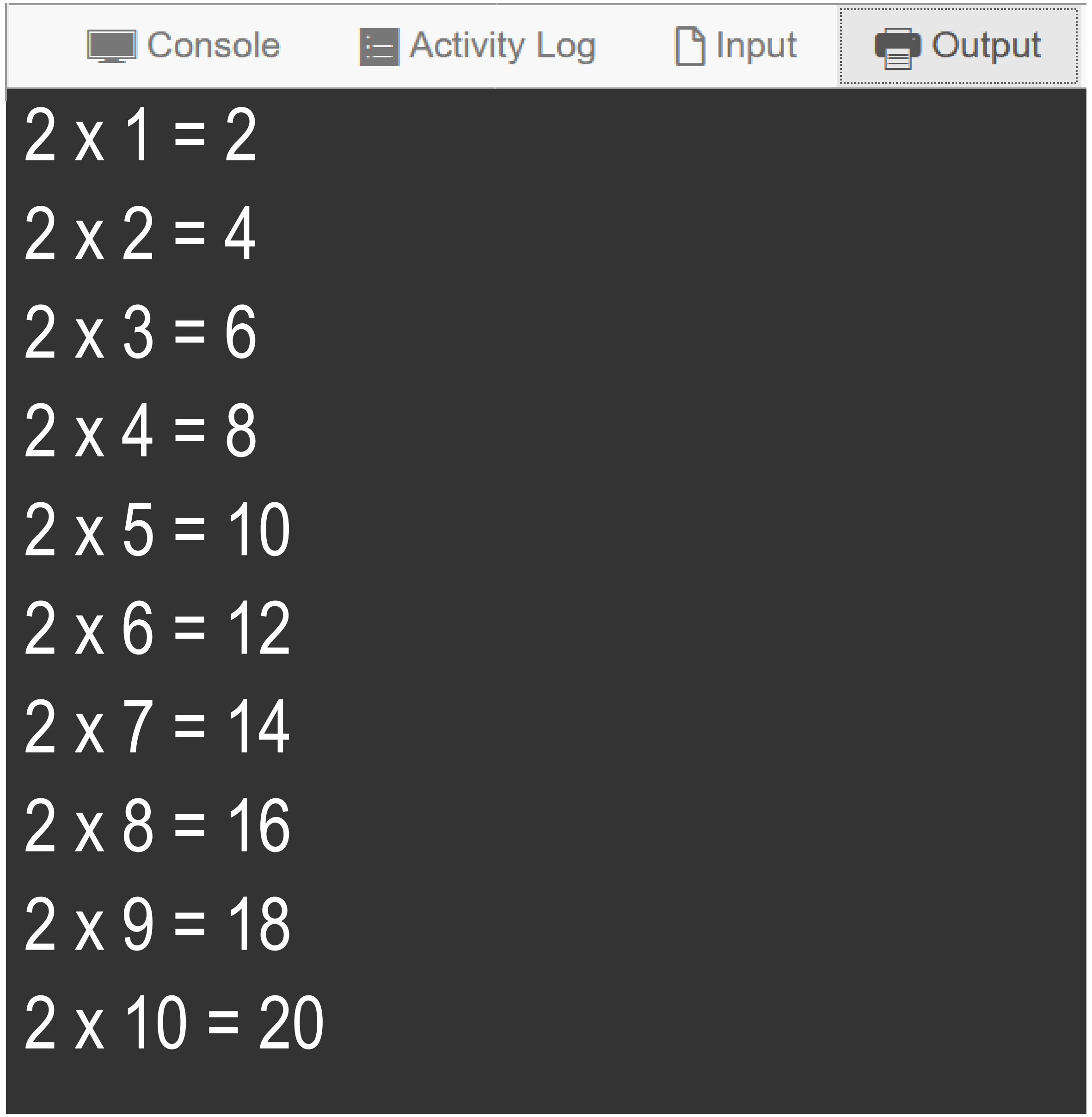
How we usually speak to a human

Printing the multiplication table of 2



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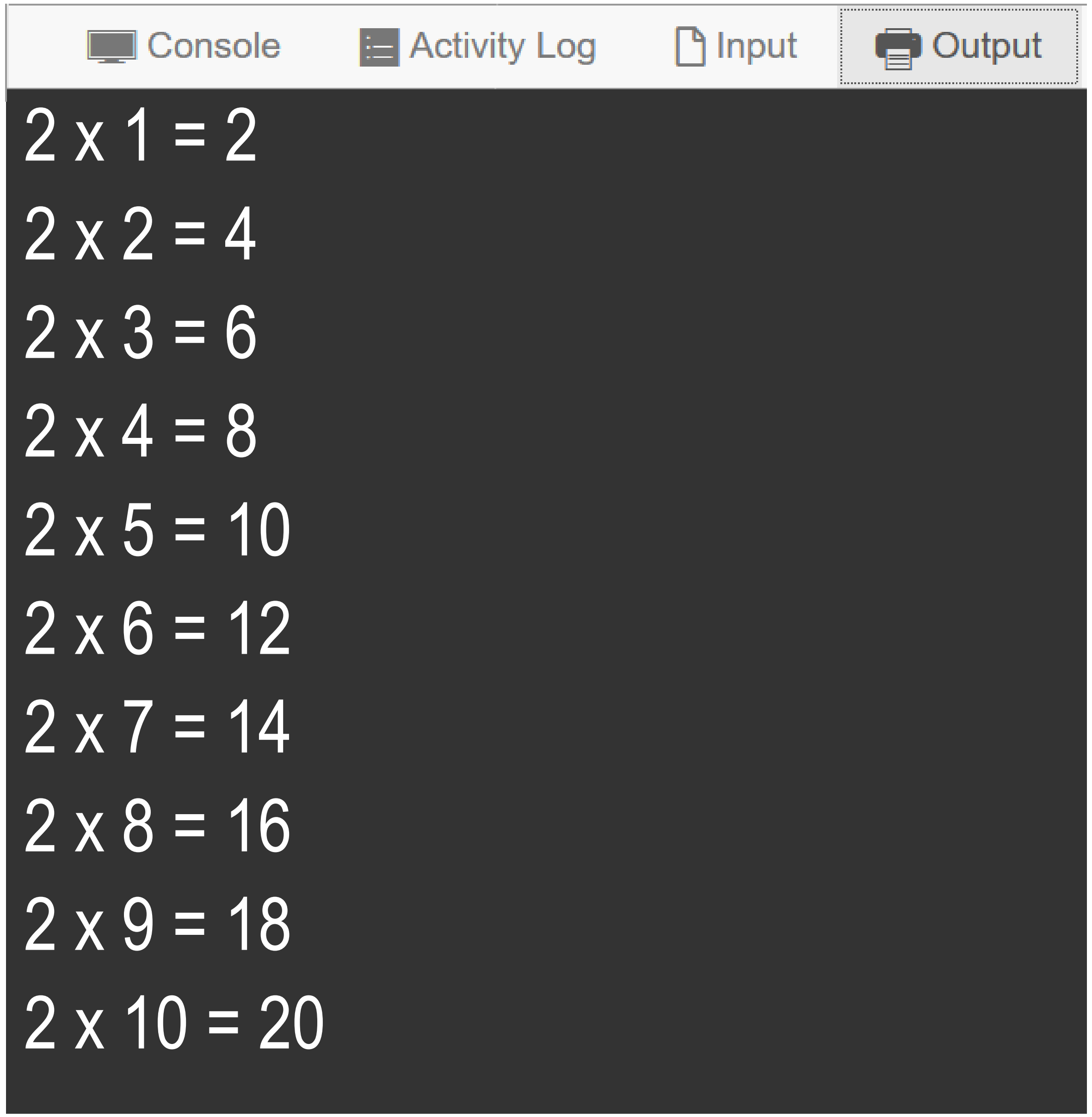
How we usually speak to a human

Printing the multiplication table of 2



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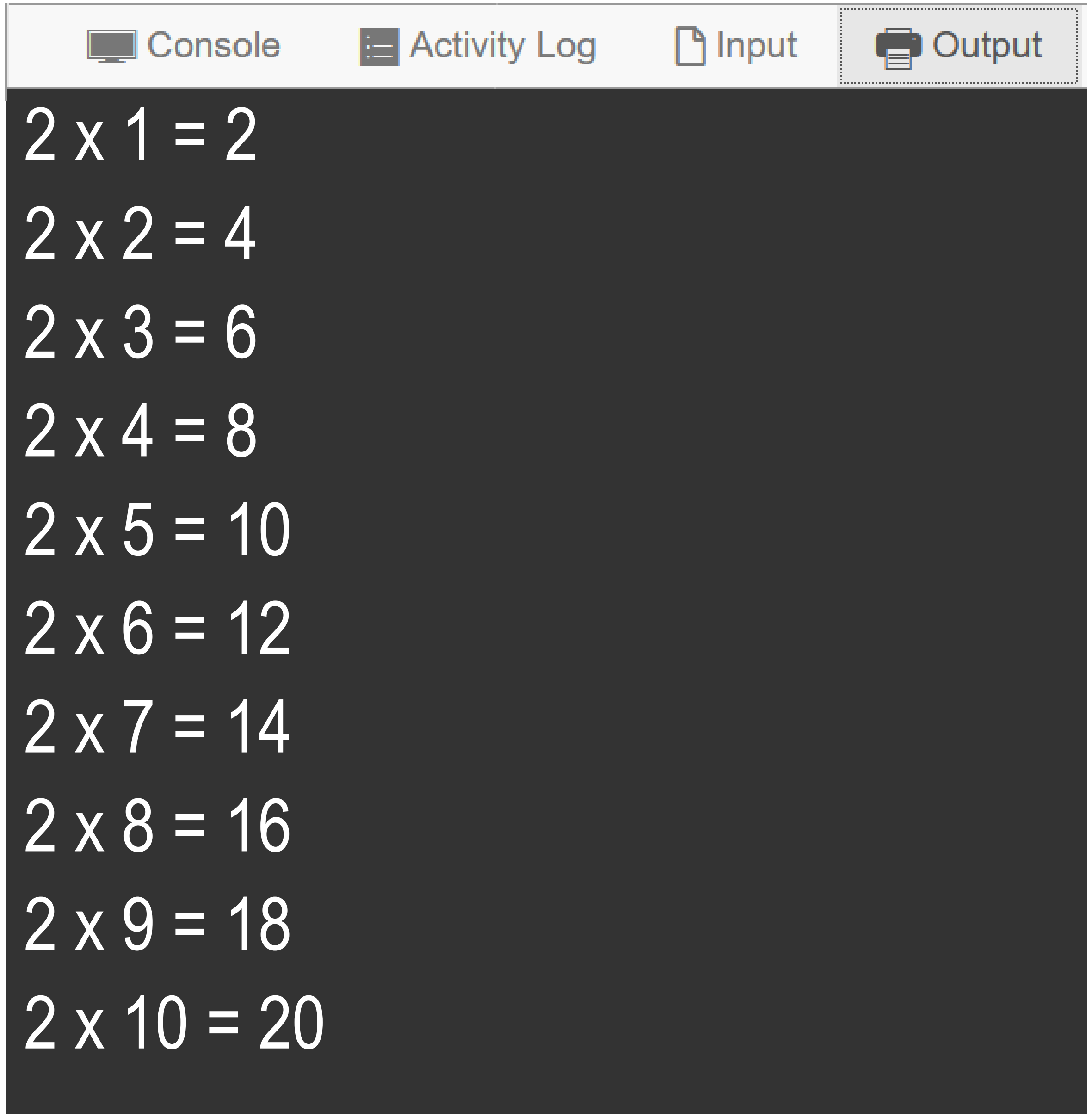
How we usually speak to a human

1. Let a = 1, b be integer variables

Printing the multiplication table of 2



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```
int a = 2, b;
for(b = 1; b <= 10; b++){
    printf("%d x %d = %d\n", a, b, a*b);
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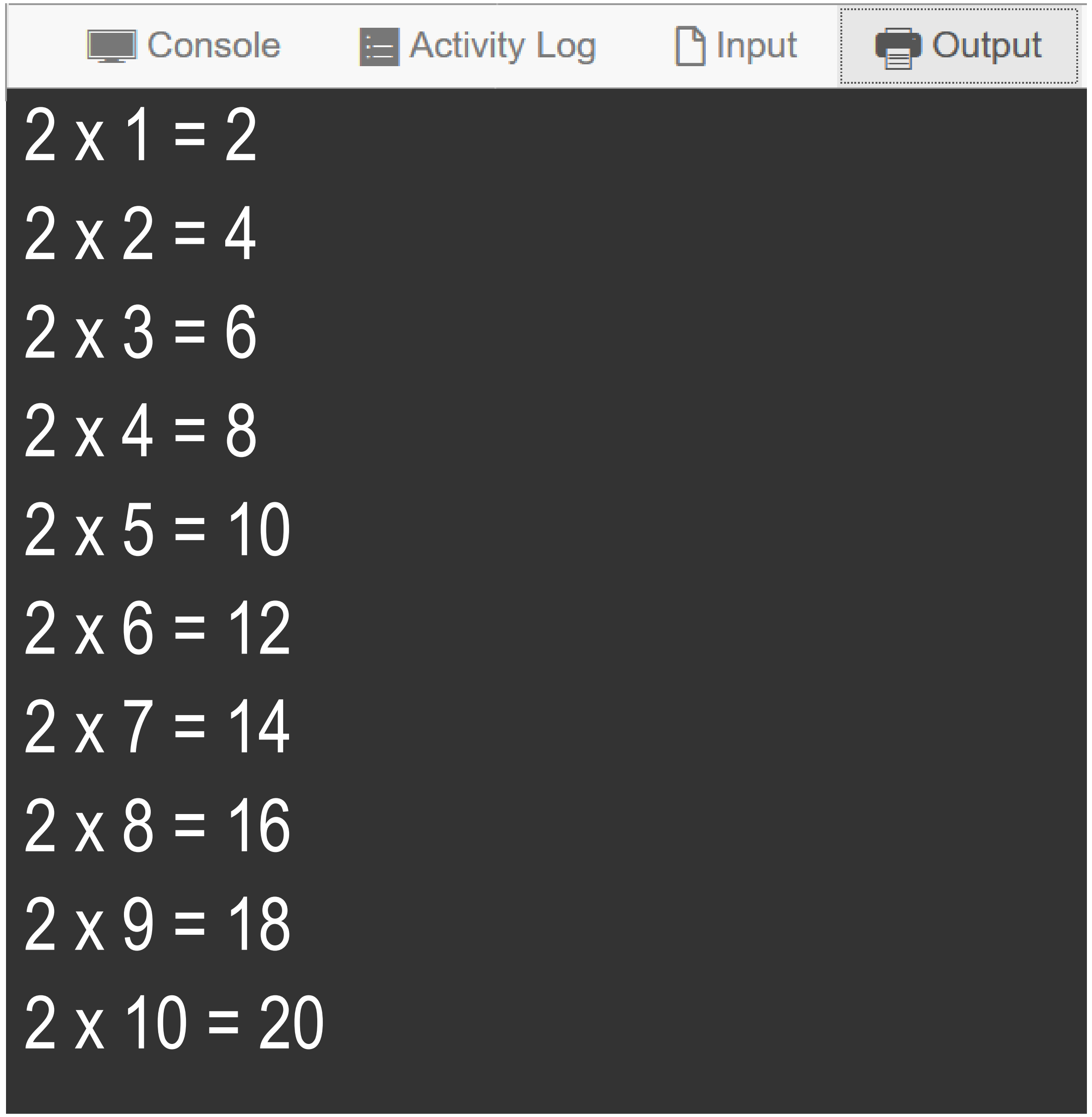
```

How we usually speak to a human

1. Let a = 1, b be integer variables
2. First set b = 1

Printing the multiplication table of 2



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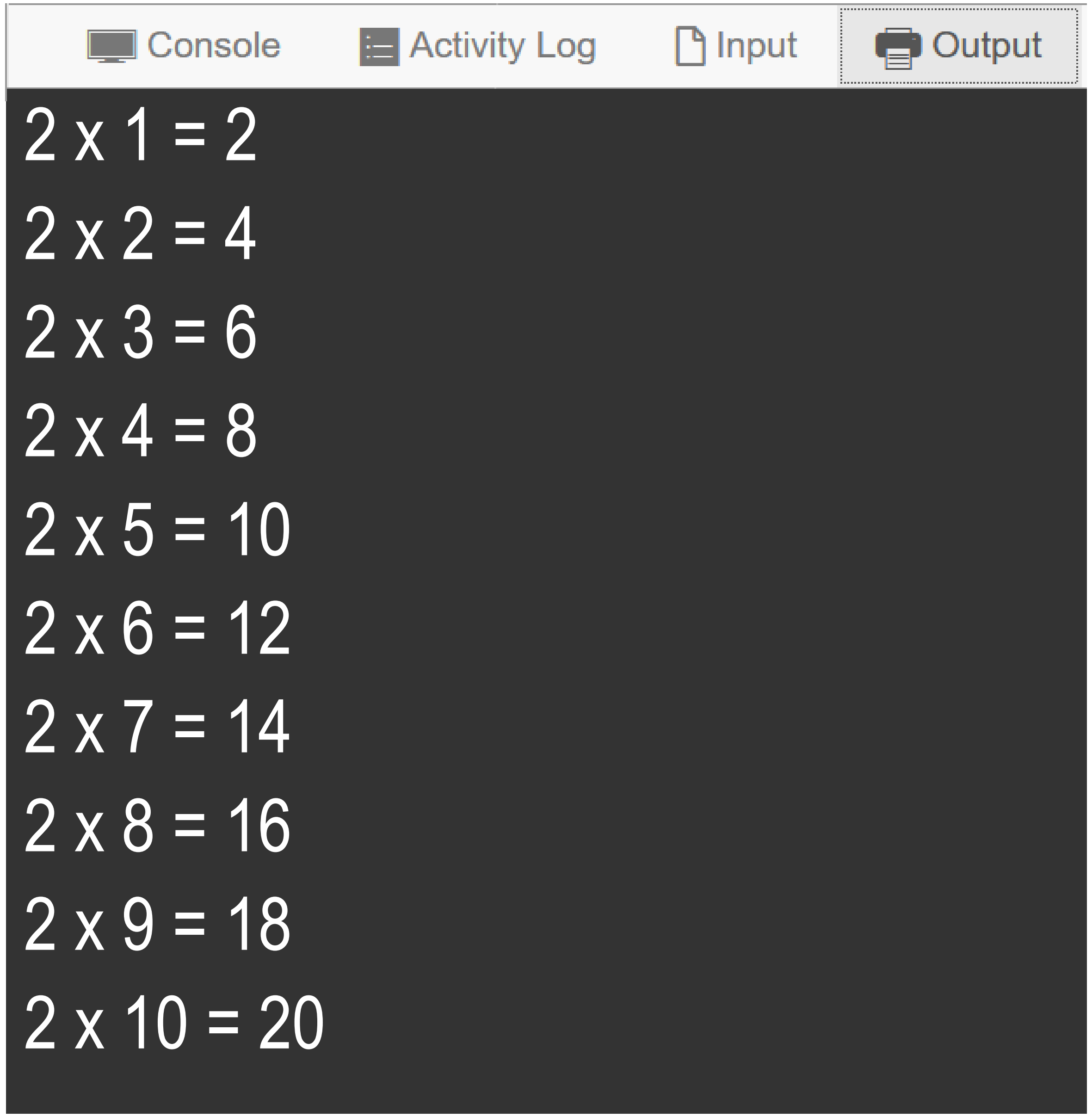
How we usually speak to a human

1. Let a = 1, b be integer variables
2. First set b = 1
3. Then check if b <= 10 or not

Printing the multiplication table of 2



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How we usually speak to a human

1. Let a = 1, b be integer variables
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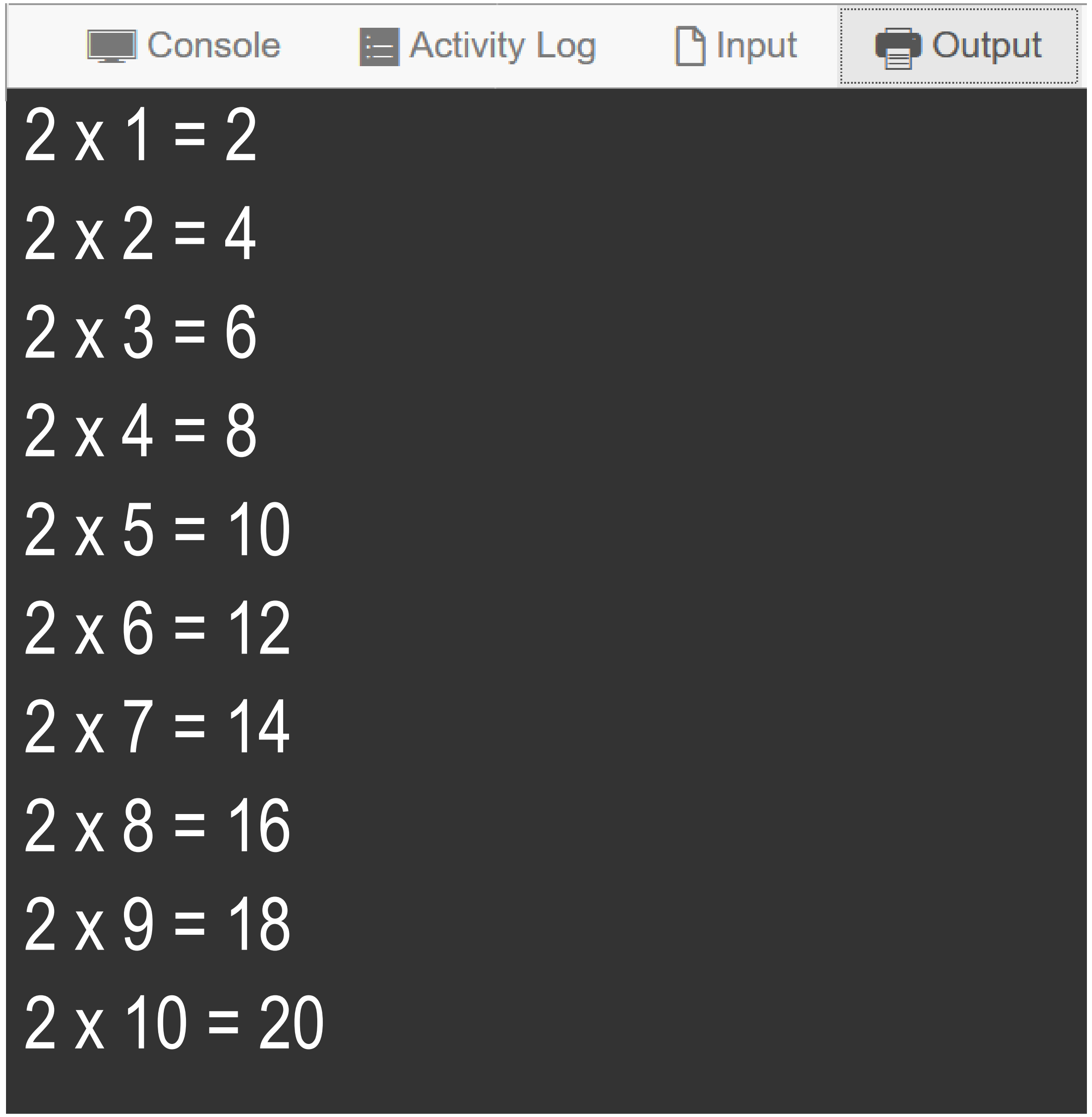
Printing the multiplication table of 2



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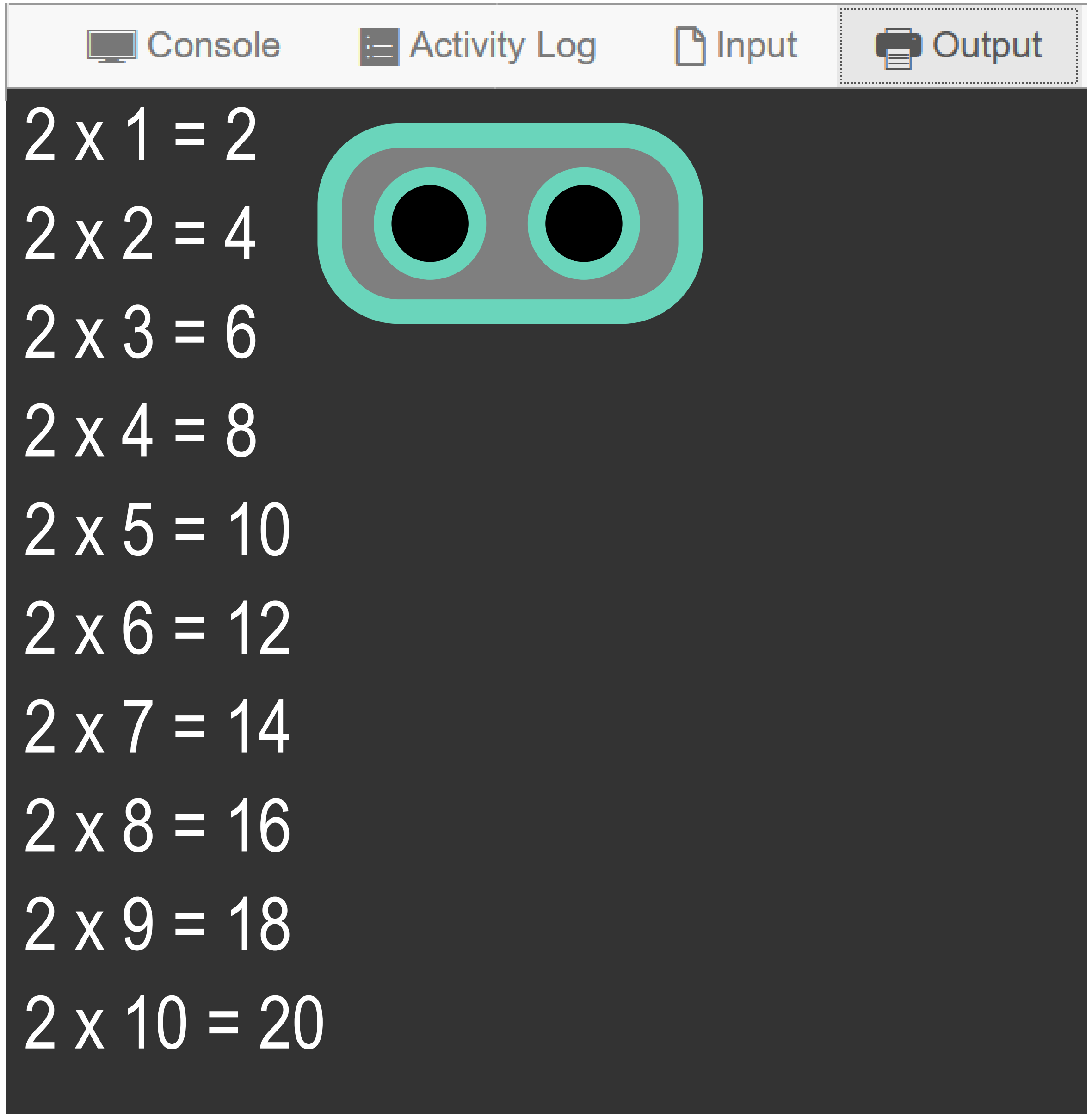
Printing the multiplication table of 2



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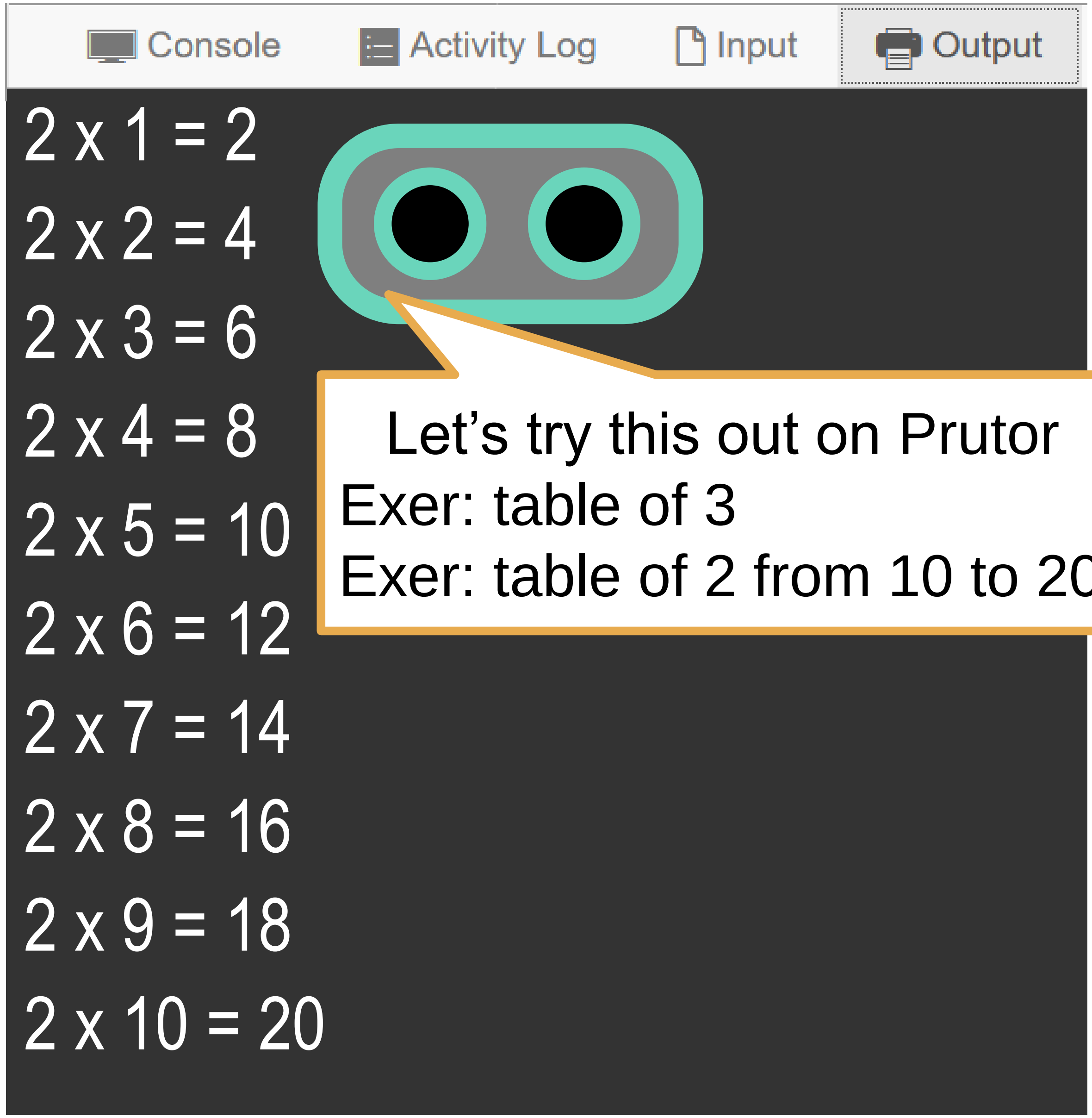

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```

Let's try this out on Prutor
Exer: table of 3
Exer: table of 2 from 10 to 20

```
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```

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The for loop

The for loop

General form of a for loop

The for loop

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```
for(init_expr; stopping_expr; update_expr){
    statement1;
    statement2;
    ...
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statement3;
statement4;
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How we usually speak to a human

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2. Then check the stopping expression

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How we usually speak to a human

1. First do what is told in initialization expression
2. Then check the stopping expression
3. If stopping expression is true

The for loop

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```
for(init_expr; stopping_expr; update_expr){
    statement1;
    statement2;
    ...
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statement3;
statement4;
...
```

How we usually speak to a human

1. First do what is told in initialization expression
2. Then check the stopping expression
3. If stopping expression is true
   Execute all statements inside braces

The for loop

General form of a for loop

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for(init_expr; stopping_expr; update_expr){
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How we usually speak to a human

1. First do what is told in initialization expression
2. Then check the stopping expression
3. If stopping expression is true
   - Execute all statements inside braces
   - Execute update expression
   - Go back to step 2

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   Else stop looping and execute rest of code

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The for loop

Brackets essential if you want me to do many things while looping

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The for loop

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for(init_expr; stopping_expr; update_expr){
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The entire for loop is considered one statement

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Can put inside for loops: printf statements, if-else/switch statements, even for loop statement (nested for loop)

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Usually init_expr, stopping_expr, update_expr involve the same variable, e.g. b in multiplication table example

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Lovingly called variable of the loop/counter variable

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stopping_expr must give true/false value

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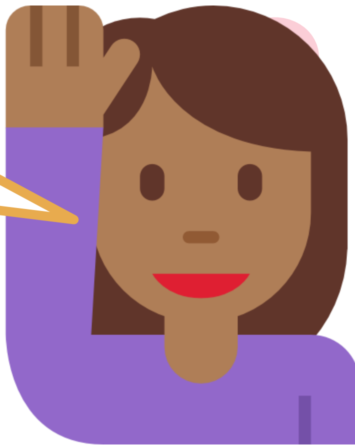
The for loop

All expressions generate values, even assignment/relational ones



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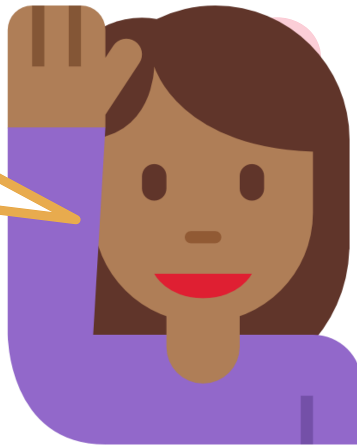

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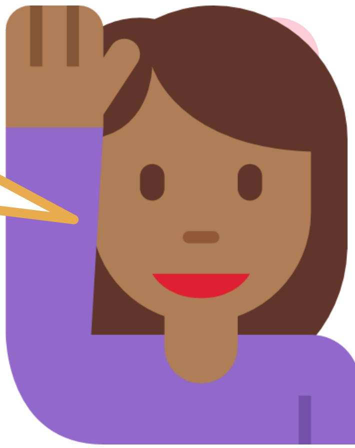

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- Warning: you can say b * 2 in stopping_expr but dangerous

The for loop

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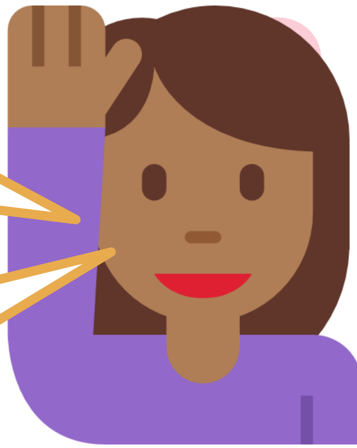
Mr C considers 0 to be FALSE and 1 (or anything non-zero) to be TRUE



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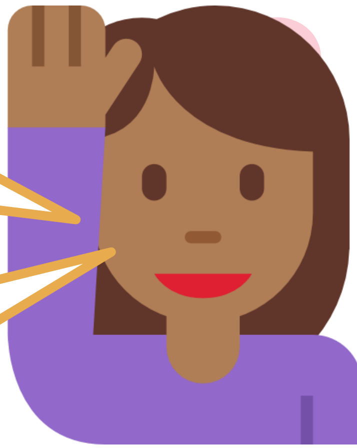

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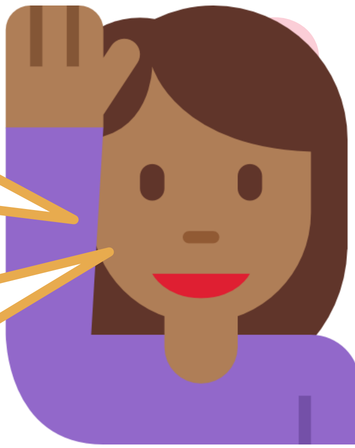

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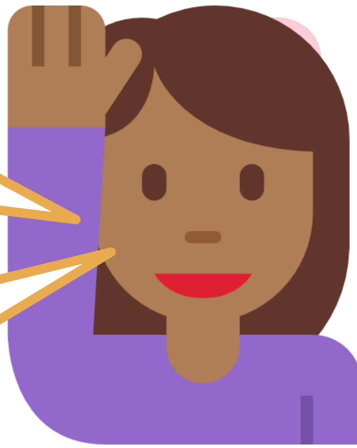

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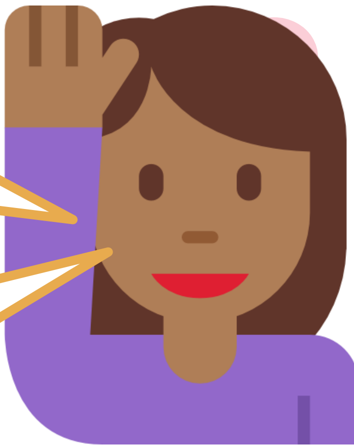

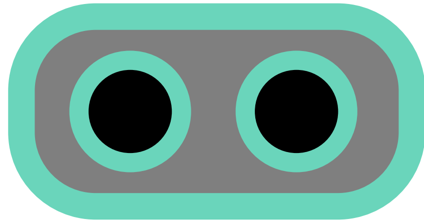

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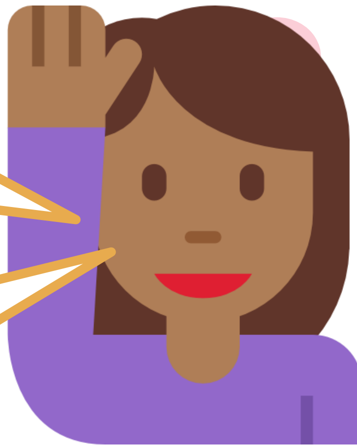
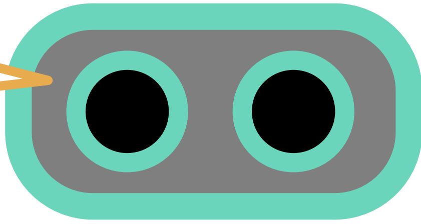
Yes, you can write the init_expr before the loop and the update_expr inside the loop





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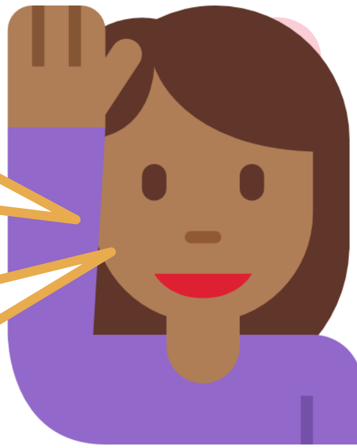

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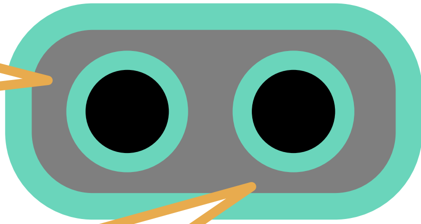

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By the way, even the stopping_expr can be empty

The for loop

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for(init_expr; stopping_exp
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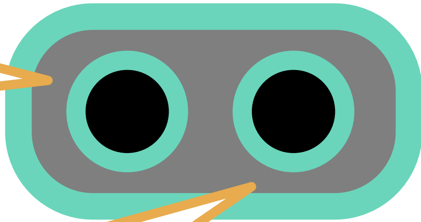

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  - Usually done by making stopping_expr a relational ex
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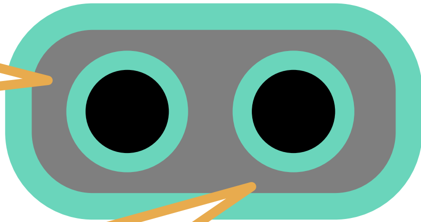
Next class ☺



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Prutor will give "TLE" error (time limit exceeded error)