



F13.2 Trace tables

Exam preparation · GCSE · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

Being the computer: a row for every change, and the checks that catch a slip.

- The method
- An example, by hand
- The same trace, printed
- Watch for these

Questions

5 marks in all

1. In a trace table, when do you write a new row?

[1 mark]

- ☐ A Every time a variable changes
- ☐ B Once at the end
- ☐ C Only when something is printed
- ☐ D Once for each variable

2. What does this program print?

[1 mark]

```
total = 0
n = 4
while n > 0:
    total = total + n
    n = n - 1
print(total)
```

3. total = 0, n = 5. WHILE n > 1: total = total + n, n = n - 2. What is total at the end?

[1 mark]

4. A loop ends when its condition is false. What should the trace show for that check?

[1 mark]

- ☐ A A row with the check written as false
- ☐ B Nothing: the loop has ended
- ☐ C The first row again
- ☐ D Only the output

5. What does 7 // 2 give?

[1 mark]

The task: print the trace

Trace the algorithm in the comment by running it, printing one line per row in the form `n=<n> total=<total> check=<true or false>`, in the order the computer reaches them. Print the check as `true` while the loop keeps going and `false` on the row that ends it. Finish with `output: <total>`.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

# total = 0
# n = 5
# WHILE n > 1
#     total = total + n
#     n = n - 2
# ENDWHILE
# OUTPUT total
total = 0
n = 5
```

Plan your program here, then type it in and press Run.



Do it on the robot

www.bugbotlab.com/learn/f13-2-trace-tables/

The simulator checks it and tells you when it passes. Nothing to install, no account.

Challenges

1. Change the loop to `n >= 1`. Which extra row appears?
2. Trace it by hand first, then run it. Did your table match?
3. Write a trace for a `for` loop over `range(3)`, showing the loop variable each time.