

For each problem, please write the output in the margin.

Problem 1: counting

```
countdown = 5
while countdown > 1:
    print(countdown)
    countdown -= 1
```

variables
countdown 5 4 3 2 1

output
5
4
3
2

Problem 2: loops inside loops

```
i = 1
while i <= 3:
    j = 1
    while j <= i:
        print(i)
        j += 1
    print('END')
    i += 1
```

variables
i 1 2 3 4
j 1 2 3 4

output
1
END
2
2
END
3
3
3
END

Problem 3: can we have a break, please?

```
num = 0
while num < 500:
    num += 100
    print(str(num) + "?")
    if num == 300:
        break
    print('YES')
```

num 100 200 300

100?
YES
200?
YES
300?

Problem 4: we must continue practicing loops!

```
num = 0
while num < 500:
    num += 100
    print(str(num) + "?")
    if num == 300:
        continue
    print('YES')
```

num 100 200
300 400 500
500

100?
YES
200?
YES
300?
YES
400?
YES
500?
YES

Problem 5: nested loops with a break

```
num = 3
while num <= 5:
    is_prime = True
    potential_factor = 2
    while potential_factor < num:
        if num % potential_factor == 0:
            is_prime = False
            break
        potential_factor += 1
    if is_prime:
        print(str(num) + ' is prime')
    else:
        print(str(num) + ' is not')
    num += 1
```

num

num 3 4 5 6

is_prime T F T

pot-factor 2 3 4 5

3 is prime
4 is not
5 is prime

Problem 6: iterating over input

```
# assume next() returns 3 the first time it is called,
# 2 the 2nd time, 0 (3rd), 5 (4th), and -1 (5th and beyond)
total = 1
```

variables

```
while True:
    num = next()
    if num < 0:
        break
    elif num == 0:
        continue
    total *= num
print(total)
```

total 1 3 0 30

num 3 2 0 5 -1

print
30

Problem 7: heat map

```
y = 0
# loop over rows
while y <= 3:
    x = 0
    # loop over columns
    while x <= 3:
        print(x+y, end='') # end='' means
        x += 1              no newline
    print() # new line
    y += 1
```

variables

y 0 1 2 3 4

x 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4

print

0123
1234
2345
3456