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Tracing While Loops

1.

The code:

```
i = 1
while i <= 10:
    print(i ** 2)
    i = i + 1
```

Memory:

i	i<=10?	print
1	True	1
2	True	4
3	True	9
4	True	16
5	True	25
6	True	36
7	True	49
8	True	64
9	True	81
10	True	100

Output:

What does this code do?: **prints the perfect squares for natural numbers 1 to 10**

2. The code:

```
count = 1

while count <= 10:
    if count%2 != 0:
        print(count)
    count = count + 1
```

Memory:

count	count<=10?	count%2!=0?	print
1	True	True	1
2	True	False	
3	True	True	3
4	True	False	
5	True	True	5
6	True	False	
7	True	True	7
8	True	False	
9	True	True	9
10	True	False	

Output:

What does the code do?: **prints the odd numbers from 1 to 10**

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3. For the following code, correct all errors if it has. Then trace the code:

```
i = 0
num = int()
avg = int()
avg = 0

while i < 5:
    num = int(input(print"Enter a number: "))
    if num >=0
        avg = avg + num
        i = i + 1

avg = avg / 5
print(avg)
```

Fixed version:

```
i = 0
num = int()
avg = int()

while i<5:
    num = int(input("Enter a number: "))
    if num >=0:
        avg = avg+num
        i = i + 1
avg = avg/5
print(avg)
```

Memory **Output**

i	**num**	**i<5?**	**num>=0?**	**avg**	
0,1	2	True	True	2	Enter a number: 2
2	4	True	True	6	Enter a number: 2
3	3	True	True	9	Enter a number: 2
4	5	True	True	14	Enter a number: 2
5	1	True	True	15	Enter a number: 2
		False		3	

What does the code do? **Collects five positive integers and calculates/prints the average of the integers**

4. The code:

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```
num = int(input()) #use testing knowledge - try different inputs!
count = 2
check = 0

while count < num:
    if num % count == 0:
        check = 1
    count = count + 1

if check == 1:
    print("FALSE!")
else:
    print("TRUE!")
```

Trace code here:

Memory **Output**

num	count	check	count < num?	Num%count == 0?	check== 1?	
8	2	0	True	True	False	
8	3	1	True	False	True	
	4	1	True	True	True	
	5	1	True	False	True	
	6	1	True	False	True	
	7	1	True	False	True	
	8	1	True	True	True	FALSE!
5	2	0	True	False	False	
	2	0	True	False	False	
	3	0	True	False	False	
	4	0	True	False	False	
	5		False	True	False	TRUE!

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What does the code do? **Prints True if the number is prime, else prints false**