

Computer Science

Task 1 – Listen [45 mins]

Listen to [this episode](#) of the Infinite Monkey Cage.

Task 2 – Programming [20 mins]

Trace this code on the right.

What is its purpose?

n	count	i	n % i	n % i == 0	output

```
n = 10
count = 0
for i in range(1, n + 1):
    if n % i == 0:
        count += 1
print(count)
```

Task 3 – Programming [15 mins]

A scanner in a carrot factory continuously reads the size of carrots on a conveyer. A program is needed to continuously find the average size of the 3 most recent carrots, starting from the 3rd numbered entered. For example, when the 4th number is given, it should display the average of the 2nd 3rd and 4th. Put these lines of code in order. You will need to add some indentation.

- `print("Average of last 3 carrots:", round(average,1))`
- `b = c`
- `while True:`
- `count = 2`
- `a = b`
- `average = (a + b + c) / 3`
- `c = float(input("Enter carrot size: "))`
- `a = float(input("Enter carrot size: "))`
- `b = float(input("Enter carrot size: "))`
- `count += 1`

Now put this into python to check that your answer works. An expected example output is given below.

Enter carrot size: 10

Enter carrot size: 12

Enter carrot size: 14

Average of last 3 carrots: 12.0

Enter carrot size: 20

Average of last 3 carrots: 15.3

Task 4 – Combinations

- How many different 8 bit binary numbers are there?
- A pin is made from 4 one digit numbers (0-9). How many pins are there?
- A username is made from 3 lowercase letters and then 2 digits. How many usernames are there?
- A product code is made from 3 hex digits. How many product codes are there?
- A lock uses a 3-digit code where every digit is different. How many codes are there?
- A logic gate has 3 inputs, A, B and C. How many different combinations of input are there?
- Starting top left and aiming for bottom right in the grids below. One move is either a single step right (R) or a single step down (D). The first problem has been solved for you, there are 3 different routes to finish. You can't travel on/through black squares. Find out how many routes there are for each setup.

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