

# **Programming Assignments without Google**

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March 14, 2024

## **In this presentation**

- I will explain a well known problem
  - And the obvious solution
- No refunds on the 15 minutes of your time.

## **Last Fall**

A new task for me:

- Teach a low level programming course
- Using a popular programming language

Elman Bashar warns: ChatGPT is our #1 enemy.

## **Two Courses**

- Last fall and this spring:
  - Data Structures and Intermediate Programming (in Java)
- This spring also:
  - Intro to Programming (in Python)
- Both courses have the same structure and the same issue

## **Standard Plan**

- We have a two hour lab block
- Students start their weekly problem set in lab
- Finish at home
- Problem set is due the night before the next lab block

## Sample Task

- Read a chapter of the textbook.
- **Do the first practice project**

## Plan A: Actually do the thing



The image shows a screenshot of a Python IDE window. The title bar reads "collatz1.py - C:/Users/nt1171/OneDrive - USNH/Documents/collatz1.py (3.12.1)". The menu bar includes "File", "Edit", "Format", "Run", "Options", "Window", and "Help". The main editing area contains the following code:

```
def collatz(number):  
    ...
```

The status bar at the bottom right indicates "Ln: 5 Col: 0".

Plan B: Hey **ChatGPT**

**In Python**, Write a function named `collatz()` that has one parameter named `number`. If `number` is even, then `collatz()` should print `number // 2` and return this value. If `number` is odd, then `collatz()` should print and return `3 * number + 1`.



 ChatGPT

Here's the `collatz()` function implemented according to your description:

```
python Copy code  
  
def collatz(number):  
    if number % 2 == 0:  
        result = number // 2  
        print(result)  
        return result  
    else:  
        result = 3 * number + 1  
        print(result)  
        return result  
  
# Example usage:  
num = 5  
print(collatz(num)) # Output will be 16
```

This function checks if the number is even or odd. If it's even, it performs the operation `number // 2` and returns the result. If it's odd, it performs the operation `3 * number + 1` and returns the result.

Maybe that one was too easy. Hey **ChatGPT**  
In Python, write a function that takes a list of strings and returns the length of the longest string in the list.

 ChatGPT

Sure, here's a Python function that does that:


```
python Copy code  
  
def longest_string_length(strings):  
    max_length = 0  
    for string in strings:  
        if len(string) > max_length:  
            max_length = len(string)  
    return max_length  
  
# Example usage:  
string_list = ["apple", "banana", "kiwi", "orange"]  
print(longest_string_length(string_list)) # Output will be 6
```

This function iterates through each string in the list and keeps track of the length of the longest string encountered so far. Finally, it returns the length of the longest string.

How about my Data Structures class? Hey

**ChatGPT**

In Java, write a static method that uses a priority queue to sort an ArrayList.

 ChatGPT

Sure, here's an example of a static method in Java that sorts an ArrayList using a PriorityQueue:

```
java Copy code  
  
import java.util.ArrayList;  
import java.util.PriorityQueue;  
  
public class ArrayListSorter {  
    public static <T extends Comparable<? super T>> void sortArrayList(ArrayList<T> list) {  
        PriorityQueue<T> priorityQueue = new PriorityQueue<>(list);  
        list.clear();  
        while (!priorityQueue.isEmpty()) {  
            list.add(priorityQueue.poll());  
        }  
    }  
  
    public static void main(String[] args) {  
        ArrayList<Integer> numbers = new ArrayList<>();  
        numbers.add(5);  
        numbers.add(2);  
        numbers.add(7);  
        numbers.add(1);  
        System.out.println("Before sorting: " + numbers);  
        sortArrayList(numbers);  
        System.out.println("After sorting: " + numbers);  
    }  
}
```

- Everyone's complaining about ChatGPT right now.
- So this is a new problem, right?

Hey **Google**

collatz function in python



collatz function in python



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Stack Overflow

<https://stackoverflow.com> > [questions](#) > [making-a-collatz...](#) [⋮](#)

### Making a collatz program automate the boring stuff

Write a function named `collatz()` that has one parameter named `number`. If the number is even, then `collatz()` should print `number // 2` and return ...

[29 answers](#) · Top answer: `def collatz(number): if number % 2 == 0: print(number // 2) return nu...`

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## 29 Answers

**37**

```
def collatz(number):
```

```
    if number % 2 == 0:
        print(number // 2)
        return number // 2
```

```
    elif number % 2 == 1:
        result = 3 * number + 1
        print(result)
        return result
```

```
n = input("Give me a number: ")
while n != 1:
    n = collatz(int(n))
```



## **The Problem**

General web access just gives the answers for intro programming tasks.

## **Solution #1**

Don't reuse problems.

There just aren't that many short functions that take and return an integer.

## **Solution #2**

“They’ll get to use the web in the real world, let them do it now.”

- This is the course topic
- Like calculators when teaching arithmetic

## **Solution #3**

Use an obscure programming language for intro courses.

- My previous institution used an in-house language
- Tradeoffs; not a long term solution

## **Solution #4**

Ban web resources

- Difficult for homework.
  - Plausible during the lab block
- That's what I tried this Spring.

## **Lab Web Rules**

Allowed:

- Course Website
- Textbook
- Official documentation

Not allowed:

- Search engines
- AI
- Discussion / Q&A resources
- Personal devices

## **Pretending it's 1990?**

“Kids these days can't remember stuff. They just let these new-fangled books do it for them.”

## **Complications**

- Assignments needed to be shortened to fit in lab block.
  - About half as long as old labs
  - Still have homeworks - but tuned assuming web access
- Requires active proctoring.
  - Took a couple weeks for students to believe “no Google”



## **Results**

- This worked great.
- I'm going to keep doing it.

## **Downsides**

- Assignments can't be as big.
  - Not a problem for Intro
  - More of an issue for DS / Intermediate
- Twice as many assignments to grade.
  - Each half as big, still a bit more work.
- Need to make sure the resources provided are sufficient.

## Future

- I had small classes, proctoring may be hard to scale.
- Better:
  - Having the lab computers (partially?) offline
  - Local resources only or only allowed resources
  - Might try that in the fall
  - Need to deal with assignment submission

## Questions / Thoughts?

- Slides and contact info at **<https://slides.homework.quest/>**