

CS103 – Spring 2022- Lab 11 Exercises

Exercise Instructions

- Make a folder **Lab11** inside your **cs103sp22** folder.
- Create a new notebook inside your Lab10 folder (`lab11.ipynb`).

You have two types of questions: exercises and practice problems. The answers will be given for the exercises, and you are expected to solve the practice problems. However, feel free to seek help from your friends or TAs to solve the problems. Remember, the lab assignments are not individual, and you can get any help you want.

Grade by #correct: Exercises: 70 points

Each practice problem: 15 points

Deliverables: `lab11.ipynb`

Exercises

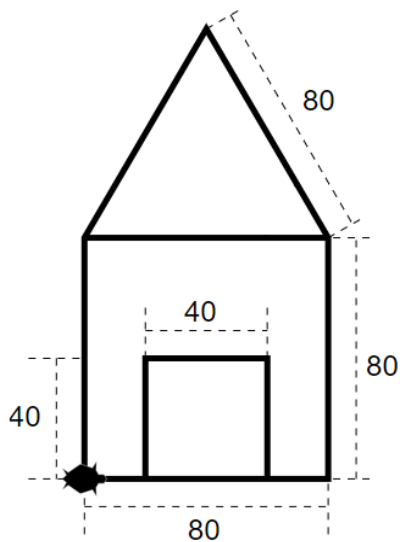
EXERCISE 1:

Write a function `tHouse` that takes an int `n1` and draws a basic house shape which has the lengths of `n1` pixels. The size of the gate will be $(n1/2) \times (n1/2)$ pixels. *Note: You will use turtle graphics to do this. It might help to create helper functions to accomplish this task.*

Sample Input:

```
n1 = 80
```

Sample Output



EXERCISE 2:

Write a function `twoDmatrix` that takes two int `n2` and `m` and doesn't return anything. The function prints a matrix such that $1 \leq n2 \leq 10$ and $0 \leq m \leq 99$ (you can assume these inputs). The function must print the numbers from 0 to `m`, printing `n` numbers per line. The numbers must be separated by two or three spaces. Hint: Use output formatting.

Sample Input:

```
n2 = 6
```

```
m = 21
```

Sample Output

```
0   1   2   3   4   5
6   7   8   9  10  11
12  13  14  15  16  17
18  19  20  21
```

EXERCISE 3:

Write a function `armstrongChecker` that takes an int `a` and returns a **Boolean Value** (True/False). The function checks whether a given number is an Armstrong number or not. An Armstrong number is a number such that the sum of its digits raised to the third power is equal to the number itself (Assume `a` is a three-digit number: 100-999).

Sample Input:

```
a = 371
```

Sample Output

```
True
```

Hints: `3**3+7**3+1**3=371`.

Practice Problems

PRACTICE PROBLEM 1:

Write a function “**cEmail**” that takes a string “**s1**” and returns another string. Assuming that **s1** is an email address in the “username@companyname.com” format, please write function to print the company name of a given email address. Both usernames and company names are composed of letters only.

Sample Input

```
s1= "unan@uab.edu"
```

Sample Output

```
"uab"
```

PRACTICE PROBLEM 2:

Write a function “**basicStats**” that takes a NumPy array “**npArray**” and returns a list. The list will contain three values: mean, standard deviation, and variance of the input array.

Sample Input:

```
npArray = [0,1,2,3,4,5]
```

Sample Output:

```
[2.5, 1.707825127659933, 2.9166666666666665]
```

hints:

- mean = 2.5
- std = 1.707825127659933
- var = 2.9166666666666665