

Homework 1

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Problem C1**Collaborators:** None

Problems will be answered with a combination of written explanations, equations, plots, and images.

$$\begin{aligned}\mathbb{E}[X + Y] &= \mathbb{E}[X] + \mathbb{E}[Y] \\ &= 42.\end{aligned}$$

If you reference any outside material or theorems not discussed in class, please add a link and explanation: <https://xkcd.com/2042/>.

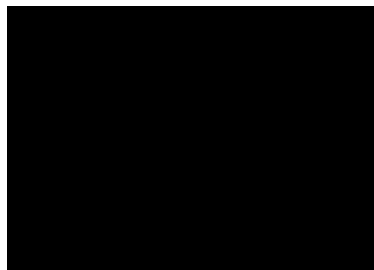


Figure 1: Please explain all plots or diagrams with a sufficiently detailed caption!

Occasionally you may be asked to include code snippets:

```
def majorityElement(self, nums):
    count = 0
    candidate = None

    for num in nums:
        if count == 0:
            candidate = num
        count += (1 if num == candidate else -1)

    return candidate
```

And sometimes it might be helpful to include pseudocode:

```
count  $\leftarrow$  0  
candidate  $\leftarrow$  null  
for  $i \in a_1, \dots, a_n$  do  
  if count == 0 then  
    candidate  $\leftarrow$   $a_i$   
  end if  
  count  $\leftarrow$  count + 1  
end for  
return candidate
```

Problem 2

Collaborators: List all collaborators here, or simply write “None” if you worked alone.

Please start each new problem on a new page. This makes it easier to separate out problem sets during grading.