

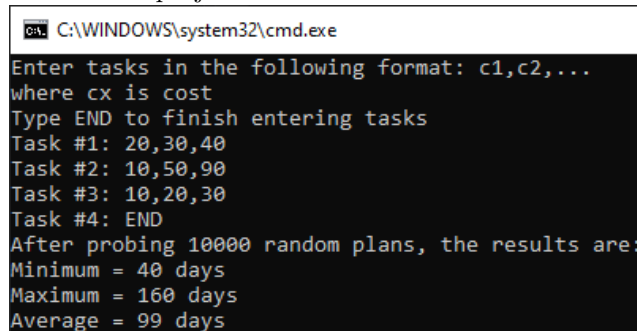
# Project 05: Monte Carlo

dr Szymon Murawski

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Your task is to write a program, that given list of tasks and estimates on the tasks completion dates will calculate what is the average time to finish the plan. The probabilities in my program sometimes do not sum up to 100%, it's the effect of rounding the numbers to integers. On pictures you have my take on this tasks, but if you have your own (probably better) idea, go with it!

1. (2 points) Ask the user to provide list of tasks and estimates for best, worst and average case scenarios. For simplicity require user to input exactly three tasks with exactly three estimates.
2. (4 points) Implement the Monte Carlo algorithm and calculate the average time for the project to finish.



```
ca. C:\WINDOWS\system32\cmd.exe
Enter tasks in the following format: c1,c2,...
where cx is cost
Type END to finish entering tasks
Task #1: 20,30,40
Task #2: 10,50,90
Task #3: 10,20,30
Task #4: END
After probing 10000 random plans, the results are:
Minimum = 40 days
Maximum = 160 days
Average = 99 days
```

3. (4 points) Group the intermediate results (estimates for individual plans) into buckets and display the probability of project finishing for each bucket. Algorithm for dividing numbers into buckets is pretty well described in <https://xaviergeerinck.com/creating-a-bucketing-function>

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Task #2: 10,50,90
Task #3: 10,20,30
Task #4: END
After probing 10000 random plans, the results are:
Minimum = 40 days
Maximum = 160 days
Average = 99 days
Probability of finishing the plan in:
40 days: 12%
52 days: 11%
64 days: 7%
76 days: 7%
88 days: 19%
100 days: 7%
112 days: 8%
124 days: 7%
136 days: 11%
148 days: 11%
```

4. (4 points) Display the accumulated probabilities, for every bucket adding the sum of previous ones

```
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After probing 10000 random plans, the results are:
Minimum = 40 days
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Average = 99 days
Probability of finishing the plan in:
40 days: 12%
52 days: 11%
64 days: 7%
76 days: 7%
88 days: 19%
100 days: 7%
112 days: 8%
124 days: 7%
136 days: 11%
148 days: 11%

Accumulated probability of finishing the plan in or before:
40 days: 12%
52 days: 23%
64 days: 30%
76 days: 37%
88 days: 56%
100 days: 63%
112 days: 71%
124 days: 78%
136 days: 89%
148 days: 100%
```

5. (3 points) Allow user to enter any amount of tasks
6. (3 points) Allow user to enter any amount of estimates for a task
7. BONUS: allow the user to enter estimates in format  $x : y$ , where  $x$  is the cost and  $y$  is the probability of this estimates. For example something like  $100 : 5, 300 : 90, 900 : 5$  would mean, that for this specific task there is 5% probability of finishing it in 100 days, 5% for finishing in 900 days, and 90% probability of finishing in 300 days

```
C:\WINDOWS\system32\cmd.exe
Enter tasks in the following format: c1:p1,c2:p2,...
where cx is cost and px is probability
Type END to finish entering tasks
Task #1: 10:5,30:90,40:5
Task #2: 10:50,20:50
Task #3: 1:10,2:10,3:10,4:10,5:10,6:50
Task #4: 20:100
Task #5: END
After probing 10000 random plans, the results are:
Minimum = 41 days
Maximum = 86 days
Average = 50 days
Probability of finishing the plan in:
41 days: 45%
46 days: 22%
51 days: 22%
56 days: 1%
61 days: 1%
66 days: 2%
71 days: 3%
76 days: 1%
81 days: 1%
86 days: 0%

Accumulated probability of finishing the plan in or before:
41 days: 45%
46 days: 67%
51 days: 89%
56 days: 90%
61 days: 91%
66 days: 93%
71 days: 96%
76 days: 97%
81 days: 98%
86 days: 98%
```