How Cat-chudon Avoids Cat-astrophe
Lab 2 Problem #1 – An Application of Sorting

In the bustling city of **Meowtopia**, a brilliant cat named **Cat-chudon** worked as the kingdom's official **Knight and Taskmaster**. His job? Managing the missions.

For years, Cat-chudon executes missions using the a naive system, where the first knight to arrive would get their mission done first. But this led to **The Great Delay Cat-astrophe**— some missions are long and difficult, while shorter, simpler ones had to wait for ages. The cat citizens started complaining. They wanted their kingdom to run **smoother and faster**! So, **Cat-chudon sharpened his claws and came up with a new s-cat-egy.**

*"What if we let the **shortest** mission go first? That way, we can complete more tasks in less time!"*
King Paws, ruler of Meowtopia, was intrigued. "Explain, Cat-chudon."
So Cat-chudon laid out his plan:
🐾 **Always pick the mission with the shortest remaining time.**
🐾 **If a new mission arrives and it's shorter than the current one, pause the current mission and let the shorter one finish first.**
🐾 **Once the shortest mission is done, resume the next shortest one.**
The king nodded. "Sounds purr-fect! Let's test it tomorrow!"

Your task is to help Cat-chudon determine whether the strategy will work as expected.

For each mission, you must determine the following:
- How long before each mission got completed (Turnaround times=Day of Completion-Day of Arrival)
- How long before each mission was first catered (Pounce Times= Day first catered-Day of Arrival)
- How long each mission has waited before they were catered and are sitting idle (Nap times = Turnaround times-mission length)

Example:

Mission	Day of Arrival	Mission Length (Days)
Furry	0	24
Mittens	2	3
Purrington	3	3

- Furry arrives at Day 0 so his request got catered first. Catchudon executes the task until Day 2.

- Similarly, on Day 2, Mittens arrives and the mission is shorter compared to Furry's remaining days which is 22, so Catchudon temporarily puts Furry's mission on hold and executes Mittens.
- On Day 3, Purrington arrives and has a mission length of 3. Since Mitten's remaining days left is just 2, and is shorter compared to Purrington's, Catchudon continues with execution of Mittens.
- After Catchudon finishes the Mittens mission on Day 5, Catchudon checks again and sees that Furry and Purrington were still unfinished.
- Catchudon chooses Purrington since it is shorter compared to Furry. He executes Purrington's mission until Day 8.
- From Day 9-30, Catchudon finishes the Furry Mission.

INSTRUCTIONS:

1. **Submit in LMS a zip file containing the following:**
   a. python code file (srtf.py)
   b. lab report

   SUBMISSION DETAILS
   1. **The implemented program code should be written in python**. The program should match the pseudocode that is provided in item #2.
   2. **A report in pdf format**
      a. **Write a pseudocode**
         The pdf file should contain the pseudocode of your chosen implementation. The pseudocode should be expressed in natural language through a list of steps. *Note*: Do not use a specific programming language in writing your pseudocode.

         This report should explain the steps of your algorithms. If you consulted any references, please include them in the lab report as well

Deadlines:
1. **Progress Check (Friday, March 7)**
2. **Deadline (Tuesday, March 11)**

PROGRAM SPECIFICATIONS

INPUT:

1. You will be reading input from the command line
2. First input is the number of problems / test cases to be solved, say N
3. This is followed by N chunks of data in this format:
   a. The number of missions x
   b. For each mission, input in one line with the respective
      i. Mission/Quest Name

        ii.   Day of arrival
       iii.   Mission Length

OUTPUT:
1. For each problem / test case, print 4 lines containing the following
    a. Order of mission execution (name of mission at each time tick)
    b. turnaround times for each mission (in order of input)
    c. pounce times for each mission (in order of input)
    d. nap times for each mission (in order of input)

EXAMPLE INPUT:

```
2
3
Furry 0 24
Mittens 2 3
Purrington 3 3
4
Whiskers 0 8
Catingko 1 4
Meowra 2 9
Pawpaw 3 5
```

EXAMPLE OUTPUT

Furry Furry Mittens Mittens Mittens Purrington Purrington Purrington Furry
30 3 5
0 0 2
6 0 2
Whiskers Catingko Catingko Catingko Catingko Pawpaw Pawpaw Pawpaw Pawpaw Pawpaw Whiskers Whiskers Whiskers Whiskers Whiskers Whiskers Whiskers Meowra Meowra Meowra Meowra Meowra Meowra Meowra Meowra Meowra
17 4 24 7
0 0 15 2
9 0 15 2

Credits to ChatGPT for the storyline.