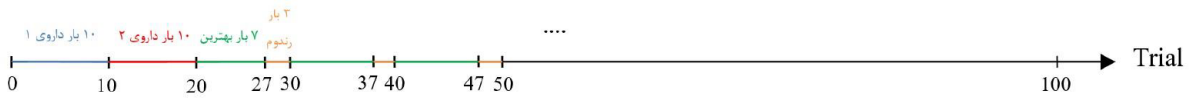
Homework 1 – RL

There are two different formulations of blood pressure lowering drugs produced by a pharmaceutical company. Patients who come to the clinic with emergency conditions are prescribed this medicine for rapid systolic blood pressure reduction. To compare the effectiveness of these two drugs, three doctors from this company prescribed them to a group of volunteers (each to 100 volunteers) as part of a clinical trial:

Doctor A. Win-stay lose-shift approach

Doctor B. Random approach

Doctor C. first prescribes 10 times of each medicine. Then they prescribe 7 times the drug that has the maximum effect and again 3 times are randomly selected and this process continues (according to the figure below):



According to the approved law, blood pressure of volunteers is taken to check the effectiveness of the drug. The amount of pressure reduction (in cmHg) to the desired level is considered a reward, and otherwise a penalty is applied. In our opinion, any drug that is better and more stable is better and more stable. To receive this reward should use the corresponding function like this:

```
from BP_reward import get_reward
r = get_reward(action # , student_id)
```

Questions

1. Implement this topic in the Python environment with the help of the given functions. Run each method once for one hundred patients (100 trials).

   Show the result with the reward chart according to trial d. Analyze the results.

2. It is necessary to repeat question 2 several times and then report the result. (Why?) Do this Repeat once with 5 executions and another time with 20 executions. Display the result as a trial reward graph. Display the confidence interval with α=0.05 in these graphs d. The approaches of 3 doctors compare.
3. Draw a boxplot diagram of the rewards of the three doctors for the experiment with 10 replications and only for the last patient (in the hundredth trial).
4. Some experts claim that the first drug is more effective than the second drug. Check the correctness of this claim using the hypothesis test.
5. Read A/B testing from links 1 and 2. Which doctor is closest to this test method? What are the advantages and disadvantages compared to others?