Critical Thinking and Problem Solving
Application of Critical Thinking

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Task 1

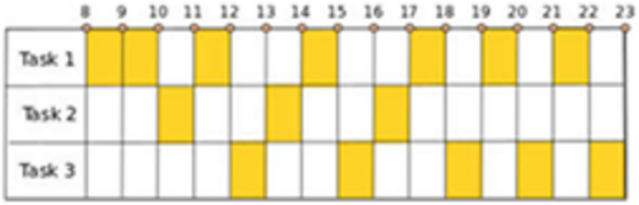
The robot beaver can multitask. Each task requires 1, 2, 3, or more hours of work. In one hour, the robot can only do one task. At the end of each hour, he checks if there is a new task:

1. If yes, then the robot must start working on the new task.
2. If not, the robot continues to do the task that has not been done for the longest time.

The following is an example of a work schedule for the robot in a day.

- At 8:00, there is a task that takes 7 hours
- At 10:00, comes the task that takes 3 hours
- At 12:00 o'clock, comes the task that takes 5 hours

In the table, the yellow color indicates the task is in progress, the white color indicates the task is pending.



Task-1 finishes at 22:00, Task-2 finishes at 17:00, and Task-3 finishes at 23:00

If the robot accepts the following four tasks:

- Task-1: at 8:00 p.m. takes 5 hours
- Task-2: at 11:00 takes 3 hours
- Task-3: at 14:00 takes 5 hours
- Task-4: at 17:00 takes 2 hours

At what time will each task be completed. Robot can do only one task at once time.

Table 1: Robot Schedule

Task	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	
Task 1																
Task 2																
Task 3																
Task 4																

Task 2

During their 6-day vacation, Laravel and Zend have a plan to go to Grandma's village. Incidentally, there were three farmers A, B, and C who needed help in cultivating their respective fields. They offered Laravel and Zend a fee if they would help them. Each of these farmers makes a different offer:

- Farmer A offers 10 thousand rupiah for each (Laravel and Zend) every day.
- Farmer B will only give Zend ten thousand rupiah on the first day then each subsequent increase by 10 thousand to 20 thousand, 30 thousand, and so on, while he will give Laravel on the first day 100 thousand rupiah and then decrease 10 thousand rupiah every following day to 90 thousand, 80 thousand, and so on.
- Farmer C is not interested in Zend's help, so he will only give 1 thousand rupiah on the first day and will not give anything on the next day. As for Laravel, he will give a thousand rupiah on the first day, then every next day double from the previous. So, Laravel will get a thousand rupiah, 2 thousand rupiah, 4 thousand rupiah, 8 thousand rupiah and so on. They intend to spend every day of their holiday in grandmother's village helping the farmer, and they both have promised to work for the same farmer. Regarding wages, they have also secretly agreed to share equally what they get.

For which farmers do they work so that they can get the most fee?

Table 2: Farmer's Fee

Farmer	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Total**
Laravel - Farmer 1	10k	10k	10k	10k	10k	10k	60k
Zend - Farmer 1	10k	10k	10k	10k	10k	10k	60k
Laravel - Farmer 2	100k	90k	80k	70k	60k	60k	450k
Zend - Farmer 2	10k	20k	30k	40k	50k	60k	210k
Laravel - Farmer 3	1k	2k	4k	8k	16k	32k	63k
Zend - Farmer 3	1k	0	0	0	0	0	0

Total:

- Farmer 1 = 60k + 60k = 120k
- Farmer 2 = 450k + 210k = 660k
- Farmer 3 = 63k + 1k = 64k

Laravel and Zend can get the most profit if they work for Farmer 2

Task 3

The famous blue colored diamond has been stolen from the museum. The thief success to exchange the diamond for cheap green imitation jewellery. The diamond exhibition today was attended by 200 visitors. The visitors entered the exhibition room one by one. The Java inspector should be able to catch the thief by interrogating some of the visitors. Inspector Java has a list of the names of the 200 visitors who entered the exhibition hall today. The Java inspector will ask everyone the same question: Was the diamond green or blue when you saw it? Every visitor will answer honestly; except the thief, who will answer the color of the diamond is green. The Java inspector is very smart and will use a strategy where the number of people to be asked question will be minimal.

Which of the following statements can the Java Inspector deliver without lying? Explain

a) This task is a difficult one; I need to ask at least 200 people, but the most likely is 199 people.

b) I can't promise anything. If I am unlucky, then I will question every visitor.

c) It's not enough to just ask 10 people (unless I'm lucky) but I believe I can get my job done by asking less than 200 people.

d) I can guarantee that I can find the thief by simply asking less than 10 people

Explanation: The answer is **C**. Assuming the visitors enter the room one by one and we have the time series data, we can ask every visitor starting with the first visitor who enters the room. Every visitors will answer that the diamond is blue until the diamond is replaced. We can infer that the first visitor who answers green is the thief because he is the one who replaced it first. This way, we won't have to ask 200 people.