

# Eat, Sleep, Drink, Code

## Problem Statement

*This challenge is sponsored by SyncFusion.*

Alice has recognized that strategy is key for success in IEEEExtreme. Your task is to help her by writing a program that will calculate the maximum score that she can earn in marathon competitions like Xtreme.

Alice starts the competition with a certain energy level. She can only attempt a problem if her energy level prior to starting the problem is greater than or equal to the energy required by the problem. Furthermore, if she attempts to solve the problem, her energy level after the hour is reduced by the energy required by the problem.

Alice wants you to assume that every hour a problem is released, and she can make the following decisions:

- Attempt to solve the problem. She is able to accurately predict how many points she will earn by attempting the problem.
- Skip the problem and sleep. Note that she will not come back to this problem later. She will gain a fixed amount of energy by doing so.
- Drink a caffeinated cola and attempt the problem, if she has drinks remaining. She will gain a fixed amount of energy *immediately*. She can only choose this option if her resulting current energy level would be greater than or equal to the energy level required by the problem. As usual she will expend the energy required to solve the problem. In addition, as the caffeine wears off, she will lose a certain amount of energy units exactly two hours later.

Notes:

- It is ok for her energy level to become negative after losing the points due to the cola consumption. However, she will need to boost her energy by sleeping or drinking additional cola before she will be able to solve a problem.
- She can only drink one cola per hour.
- If she drinks a cola, she must attempt the problem.
- For each hour that she sleeps and skips a problem, she gains the fixed amount of energy. Thus, if she sleeps for two consecutive hours, she will gain twice as much energy as if she slept for one hour. If she sleeps for three consecutive hours, she will gain three times as much energy, etc.

## Input Format

The first line of input contains an integer  $k$ ,  $1 \leq k \leq 20$ , which indicates how many test cases are present.

Each test case then has the following format. The first line of the test case consists of the following:

[Hours] [Energy] [Sleep] [DrinkCount] [Drink] [Crash]

Where

- [Hours] gives the length of the contest in hours,  $1 \leq [\text{Hours}] \leq 168$ . (Alice envisions the day when Xtreme is a week-long contest!)
- [Energy] is Alice's energy level at the beginning of the contest,  $0 \leq [\text{Energy}] \leq 10^7$ .
- [Sleep] is the amount of energy that Alice gains by skipping a problem and sleeping,  $1 \leq [\text{Sleep}] \leq 10^6$ .
- [DrinkCount] is a count of colas that Alice has at the start of the contest,  $0 \leq [\text{DrinkCount}] \leq 24$ .
- [Drink] is the initial boost that Alice receives from drinking a cola,  $1 \leq [\text{Drink}] \leq 10^6$ .
- [Crash] is the amount of additional energy that Alice loses two hours after drinking a cola,  $1 \leq [\text{Crash}] \leq 10^6$ .

Then there follow [Hours] lines, each describing a problem, and listed in the order in which the problem is released, i.e. the problem on the first line is released at the start of the contest, the second problem is released one hour later, the third problem is released an hour after that, etc. These lines have the following format:

```
[EnergyRequired] [Points]
```

Where

- [EnergyRequired] is an integer equal to the amount of energy that Alice will expend in attempting to solve the problem,  $1 \leq [\text{EnergyRequired}] \leq 10^7$ .
- [Points] is equal to the points that Alice will earn if she attempts the problem. [Points] will be equal to an integer chosen from the following set {10, 20, 30, 40, 50, 60, 70, 80, 90, 100}.

## Output Format

For each test case, output on a separate line, a single integer equal to maximum amount of points Alice can earn in the contest.

## Sample Input

```
1
4 5 16 2 7 8
10 100
6 50
15 20
3 10
```

## Sample Output

```
160
```

## Explanation

There is only one test case in the sample input. For this test case, the contest lasts 4 hours, Alice's initial energy level is 5, she gains 16 energy units by sleeping, she has 2 colas, she gains a boost of 7 energy units by drinking a cola, but then loses 8 energy units after two hours.

In order to solve the first problem, she drinks a cola in order to boost her energy level to 12. She can then solve the first problem, and earns 100 points, by doing so. The first problem takes 10 energy units to solve.

Note that she will be penalized by 8 energy units when the third problem is released as the caffeine wears off.

At the start of the second hour, then, she has 100 points, and an energy level of 2. In order to solve the second problem, she drinks another cola. This raises her energy level to 9. She then solves the problem, earning 50 more points. She expends 6 energy units solving the problem. Note that she will lose an additional 8 energy units as the caffeine wears off prior to the release of the fourth problem.

At the start of the third hour, she has 150 points. Her energy level is depleted both by solving the previous problem and as the caffeine from the first cola wears off. Thus her energy level is -5.

She decides to sleep instead of solving the third problem. Her energy level is boosted to 11 by sleeping but reduced to 3 as the caffeine from the second cola wears off.

She then solves the fourth problem and earns 10 more points.

This sequence of decisions maximizes her point total, so your program should output 160, the total number of points that she earned.