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Datenstrukturen & Algorithmen Programming Exercise 1 FS 13

In this exercise, we want to evaluate a recurrence relation of the form

$$R_n = \begin{cases} A & \text{if } n = 0 \\ B & \text{if } n = 1 \\ C \cdot R_{n-1} + D \cdot R_{n-2} & \text{otherwise} \end{cases},$$

i.e. we want to compute $R_i \in \mathbb{Z}$ for a given $i \in \mathbb{N}$. For example, if $A = 0$, $B = 1$, $C = 1$ and $D = 1$, then R_n produces the well-known Fibonacci numbers 0, 1, 1, 2, 3, 5, 8, 13, ...

Input The first line of the input contains only the number t of test instances. After that, we have exactly one line for each test instance containing the numbers i, A, B, C, D (in exactly this order, separated by spaces). While $0 \leq i \leq 50$ is a natural number, A and B are integers from the interval $[-10^3, 10^3]$, and C and D are either 1 or -1.

Output For every test instance, we want to output a single line containing only the value R_i.

Example

Input:

```
2
20 0 1 1 1
22 5 10 1 -1
```

Output:

```
6765
-10
```

Notes

1) The values R_i can be very large. You should use the data type `long` instead of `int`.
2) To read an input from the console you can import the class `java.util.Scanner` and use the following code fragment:

```
Scanner in = new Scanner(System.in);
int value1 = in.nextInt();
int value2 = in.nextInt();
```

Hand-in: until Wednesday, 27th February 2013.