Job Scheduling

The "Land of Fire" is famous for its "Temple of Fire" - Ateshgah. To accomodate more visitors, as a master architect, you are planning to build more temples. You have one builder and n temples to build. Temples are numbered from 0 to $n-1$. According to the plan, each temple i has a prerequisite temple $p[i]$ that should be built before temple i. Only temple 0 has $p[0] = -1$, which means this temple can be built right away at time 0. Temple i takes $d[i]$ seconds to build, and finishing it at time t costs $t * u[i]$.

Find the minimum cost to build all the temples.

Implementation details

You should implement the following procedure:

```
int64 scheduling_cost(int[] p, int[] u, int[] d)
```

- p, u and d: integer arrays of length n.
- This procedure should return the minimum cost of building all temples.

Examples

Example 1

Consider the following call.

```
scheduling_cost([-1, 0, 0], [5, 2, 5], [3, 4, 1])
```

The answer is 51.

Constraints

- $1 \leq n \leq 200\,000$
- $p[0] = -1$
- $0 \leq p[i] \leq i - 1$ (for all $1 \leq i \leq n - 1$)
- $0 \leq u[i] \leq 10\,000$ (for all $0 \leq i \leq n - 1$)
- $0 \leq d[i] \leq 10\,000$ (for all $0 \leq i \leq n - 1$)

Subtasks

1. (5 points) $p[i] = i - 1$ (for all $1 \leq i \leq n - 1$)
2. (7 points) $p[i] = 0$ (for all $1 \leq i \leq n - 1$) and $d[i] = 1$ (for all $0 \leq i \leq n - 1$)
3. (12 points) $p[i] = 0$ (for all $1 \leq i \leq n - 1$)
4. (18 points) Temple 0 is prerequisite of at most 2 other temples, and all other temples are prerequisite of at most 1 other temple.
5. (21 points) $n \leq 200$
6. (37 points) No additional constraints.

Sample grader

The sample grader reads the input in the following format:

- line 1: n
- line 2: $p[0]$ $p[1]$ $p[2]$ $\ldots$ $p[n-1]$
- line 3: $u[0]$ $u[1]$ $u[2]$ $\ldots$ $u[n-1]$
- line 4: $d[0]$ $d[1]$ $d[2]$ $\ldots$ $d[n-1]$

The sample grader prints a single line containing the return value of `scheduling_cost`.