

## CSCI 2170 OLA 7

The *Bake My Day* bakery wishes to forecast the cost of producing various bakery products during the year. Each bakery product is produced using a different mix of raw ingredients. Moreover, because many of these ingredients are seasonal, the price of these ingredients varies from month to month. The bakery keeps a recipe file that is a table with one line per product that indicates the amount of ingredient needed for each product. This table looks like:

**Bakery Recipe Table**

Bakery Product	Ingredient 1	Ingredient 2	....	Ingredient N
A	--	--	--	--
B	--	--	--	--
...	--	--	--	--
M	--	--	--	--

The manager of the bakery also keeps a computerized spreadsheet that forecasts the price of ingredients for the various products by month as follows:

**Ingredient Prices by Month**

Ingredient	January	February	March	...	October
1	--	--	--	--	--
2	--	--	--	--	--
3	--	--	--	--	--
...	--	--	--	--	--
N	--	--	--	--	--

What the *Bake My Day* manager wants is a table forecasting the monthly cost of bakery products that resembles the following:

**Monthly Cost of Bakery Products Forecast**

Bakery Product	January	February	....	October
A	--	--	--	--
B	--	--	--	--
...	--	--	--	--
M	--	--	--	--

Write a C++ program to calculate and print the *Monthly Cost of Bakery Products Forecast* table using data from the files described below. All table values are non-negative integers.

The starter program "**bakery.cpp**" is available in the project folder. Develop your code incrementally. The input files for this assignment will be "**products.dat**", "**ingredients.dat**", and "**prices.dat**".

- The first line of the **products.dat** file has the number ( $M$ ) of product names found in the file. The remaining  $M$  lines of the file contain the names of all the bakery products, one product name per line. There will be at most 24 bakery products; use the symbolic constant `MAX_PRODUCTS` to control this.
- The first line of the **ingredients.dat** file has the number ( $N$ ) of ingredients per line of the file. The remaining  $M$  lines of the file contain the  $N$  ingredient amounts needed for each product. If a particular ingredient is not needed for a product, the amount is set to zero. There will be at most 30 different ingredients; use the symbolic constant `MAX_INGREDIENTS` to control this.
- The first line of the **prices.dat** file has the beginning and ending months of the cost projections. These are expressed as an integer pair, where January is encoded as 1, February as 2, and so on. Note that the cost projection period may span the end of a year; thus the beginning month value might be bigger number than the ending month. (See example below.) The remaining  $N$  lines of the file contain the prices for ingredients for each of the months. There will be at most 12 months in a forecast; use the symbolic constant `MAX_MONTHS` to control this.

The files are related in a straightforward fashion. Thus, for example, the second line of the **prices.dat** file contains data for the product identified by the second line of the **products.dat** file.

**EXAMPLE:** Suppose the data files appear as follows:

**products.dat**

```
3
Donut
Bagel
Kaiser Roll
```

**ingredients.dat**

```
5
0 10 15 5 1
0 6 3 10 20
3 6 3 10 4
```

**prices.dat**

```
11 2
10 10 5 1
30 10 15 20
50 25 25 35
40 20 40 30
20 10 8 10
```

Then the output should look something like:

```
Monthly Cost of Bakery Products Forecast
```

Product	11	12	1	2
Donut	1270	585	733	885
Bagel	1130	535	725	725
Kaiser Roll	840	405	612	568