CMPE-380
Fall 2016

Weeks 8 and 9

You have been hired on contract to lead a project team at Qooqle, a small but growing software startup in Silicon Valley Far North (aka Qikiqtarjuaq, in Qikiqtaaluf). The fact that your degree is from a university that starts with "Q" may have had something to do with the hiring.

Qooqle has an abundance of potential projects for your team to work on. Each project involves providing development and support to clients for specific periods of time.

There are too many projects to complete them all, so your first task is to select the projects that your team will complete over the next n weeks. The company requires that you choose a subset of the available projects to **maximize** the total of the billing fees that Qooqle management has set for the projects.

Each project is characterized by three integers:

a start week – this is set by the client
the number of weeks the project will take – set by the client
and the amount of revenue the project will earn for the company – set by Qooqle

Your team can only work on one project at a time, so if in Week 6 you start a project that takes 3 weeks, you are fully occupied in Weeks 6, 7 and 8. The next project in your plan cannot start earlier than Week 9.

You may assume that all projects are slated to finish no later than the end of your n-week contract. For example, the list of potential projects for an 8-week contract term might look like this:

Project #	**Start Week**	**Duration**	**Value**
1	1	3	16
2	1	2	5
3	3	3	30
4	4	2	18
5	3	1	13
6	5	4	20

Here are some possible schedule plans for this set of projects:

Week	Plan 1	Plan 2	Plan 3
Week 1	Project 1		Project 2
Week 2	Project 1		Project 2
Week 3	Project 1	Project 5	Project 3
Week 4	Project 4		Project 3
Week 5	Project 4	Project 6	Project 3
Week 6		Project 6	
Week 7		Project 6	
Week 8		Project 6	
Total Value	34	33	35

And of course there are many others. Of the three shown, Plan 3 is the best – but it is not the optimum.

Qooqle is very enthusiastic about Dynamic Programming, and you are reQuired to use this approach to solve your scheduling problem.

Input consists of a text file that is structured as follows:
Line 1: an integer representing the number of weeks in your contract
Line 2: an integer representing the number of projects
Line 3+: 4 integers:

- the project number
- the start week
- the duration
- the value

So the problem instance shown above would look like this:

```
8
6
1       1       3       16
2       1       2       5
3       3       3       30
4       4       2       18
5       3       1       13
6       5       4       20
```

Your output should show the projects selected and the total income earned.

As always, you can work in pairs on this assignment. Your solution must be coded in Python, Java, C or C++.

Data files for this assignment are provided. Run your program on each data file and submit the output as well as your code.