As a manager in a data center, it is your responsibility to allocate your resources to complete all the jobs that must be completed at the same time. The incoming jobs are called J_1, J_2, ..., J_6, and the servers are named S_1, S_2, ..., S_6

Since the servers don't have the same performance characteristics, the cost of completing a job depends on the server chosen. The following table details the cost associated to the completion of a given job on a given server.

	S1	**S2**	**S3**	**S4**	**S5**	**S6**
J1	$ 17.80	$ 16.96	$ 13.56	$ 12.22	$ 15.88	$ 17.59
J2	$ 13.11	$ 7.14	$ 8.57	$ 8.67	$7.23	$ 14.49
J3	$ 12.62	$ 9.10	$ 8.97	$7.75	$ 16.71	$ 16.59
J4	$ 12.87	$ 7.14	$ 9.75	$ 13.87	$ 13.59	$ 12.37
J5	$ 17.92	$ 14.50	$ 14.91	$ 10.00	$ 13.67	$ 12.56
J6	$ 9.90	$ 15.70	$ 15.32	$ 16.80	$ 17.34	$ 18.21

As a manager, your goal is to determine the allocation of jobs to servers that minimizes the cost for your company knowing that each server can take at most 2 jobs at the same time.

Question:

Formulate the problem and implement it with Gurobi. Return the optimal total cost for the company and the optimal allocation of jobs to servers.

Instructions:

- In your code, the optimal allocation that is returned by your function should take the form of list of tuples of integers (job, server) as follows:

optimal_allocation = [(1, x), (2, y), ..., (N, z)]

means "Job 1 is allocated to Server x, Job 2 is allocated to Server y, ... , Job N is allocated to Server z"

- Write your answers in "your_answer.py" file in Vocareum. Please do not change the names of the file(s) and function(s) nor the format of the functions' outputs. Your code can be submitted at most 5 times.
- Whenever you need to use a fonction from one of the python libraries, please do not forget to import the library directly in your function. A list of the libraries that are available for Python 2 on vocareum is provided in the following website: https://www.vocareum.com/2017/08/24/installed-software-packages/#toggle-id-3

Remark:

- The **"construct_lp_model"** code has been provided to you to construct the Gurobi model of a Linear Program in the following form:

  $\max\{c^T x\}$
  subject to:
  $Ax = b$
  $Bx \leq d$
  where the inputs A, B, b, c and d must be matrix or vector numpy arrays.

- Please refer to the following website to help you implement your solution with Gurobi if you don't want to use the **"construct_lp_model"** function: https://www.gurobi.com/documentation/7.0/quickstart_mac/py_example_mip1_py.html

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Matching Problem (External resource)...