QUESTION 4/10 SOLUTION (Cantele Alberto/Cancelliere Biagio)

We can define a field named: “Sets” where we can get all the elements that build the graph. We take the set that contains alle the N nodes of the graph and of course the associated edges.

The set has a dimension of N that represents all the works that the machine does.

After that we can define the variables that are inserted into the adjacency matrix of the graph. These variables are indicated in this way:

$$C_{ij} = P_i + S(i,j)$$

Where i and j are index between 0 and N and:

- P_i indicates the processing time for job i
- $S(i,j)$ indicates the setup time for changing the machine setup from job i to job j

The path has a weight which is the sum of the nodes’ weight (the processing time) plus the sum of the transitons’ weight (the set up time).

Let’s now define $K_{i,j}$ as:

$$\begin{cases} 1\ if\ \ C_{i,j} \in path \\ 0\ if\ otherwise \end{cases}$$

We can get this knowing that the object function X can be defined in this way:

$$X = \min\left(\sum_{i=0}^{N}\sum_{j=0}^{N} C_{i,j} * K_{i,j}\right)$$