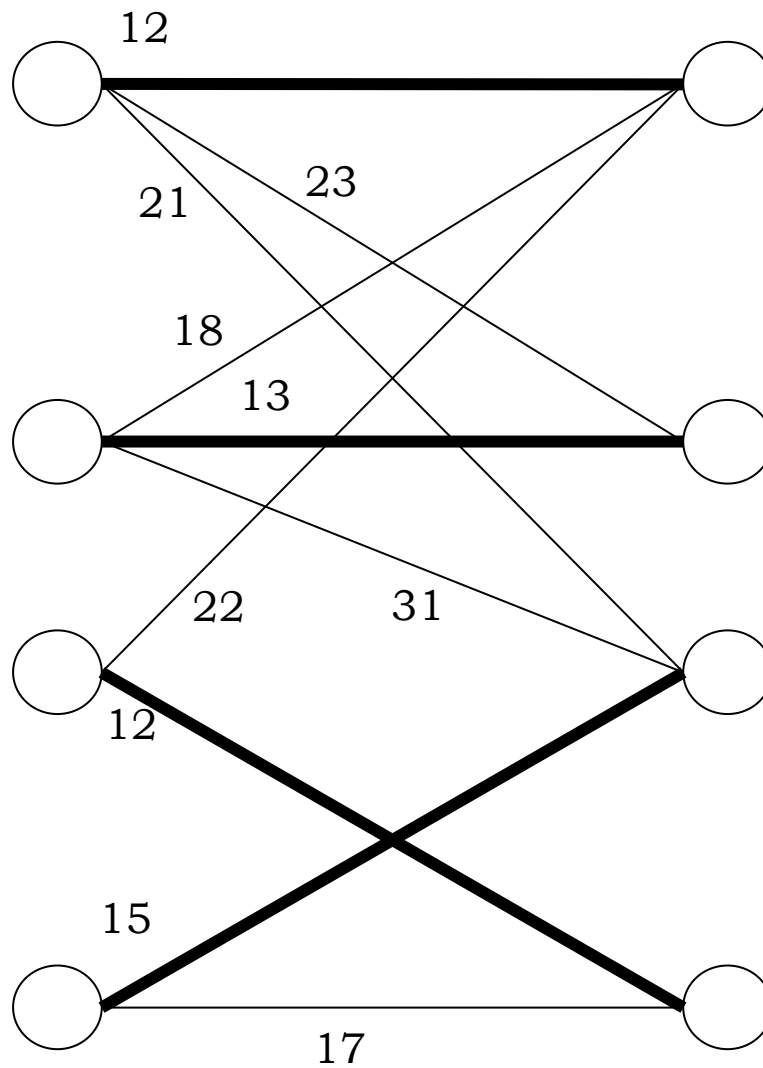


Last Name _____
First Name _____
Matricola ID _____

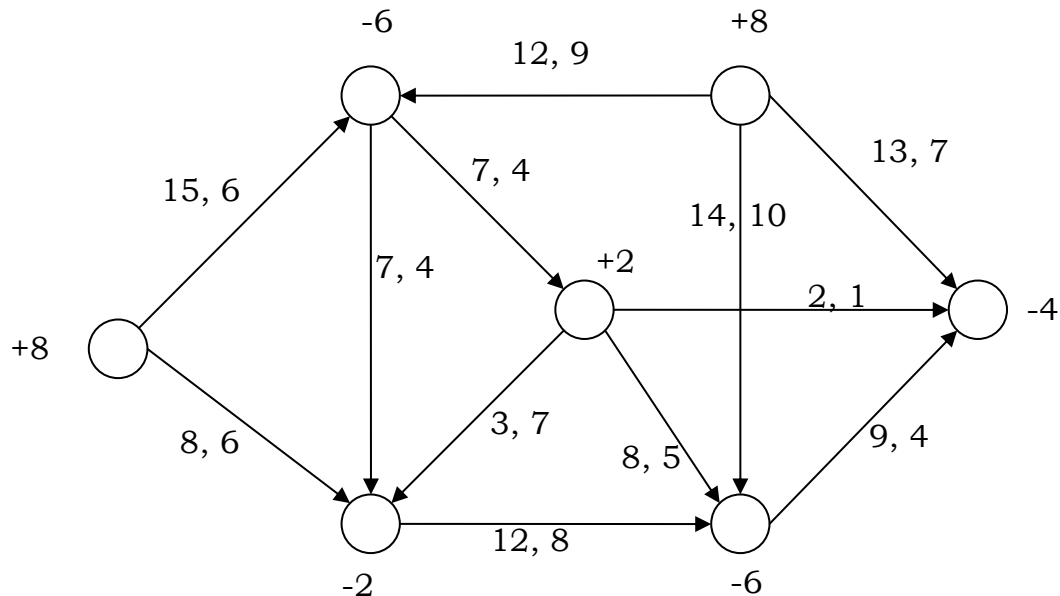
Exercise 1

Thickest edges represent a perfect matching on the following graph. Prove or disprove that this matching is the minimum weight perfect matching.



Exercise 2

Evaluate the min cost flow on the following graph (values on the arcs are c_{ij}, u_{ij})



Exercise 3

A company has 2 types of employees: part-time (5 hours work shift) and full-time (7 hours work shift). An employee can start his/her work shift at {8:00, 9:00, 12:00, 13:00}. For each hourly slot of a day the request of personnel is the following:

8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	19:00
9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	20:00
12	14	18	14	10	12	8	6	5	5	3

Given a cost of 230 Euro/day for part time employees and 340 Euro/day for full time employees, describe the model to find the mix of employees that fulfills the request minimizing the total daily cost.

Bonus question

Explain how to use the same model to check if it convenient to allow full time employees start working at 11:00.