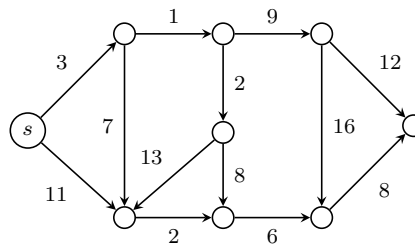


Excercise 6

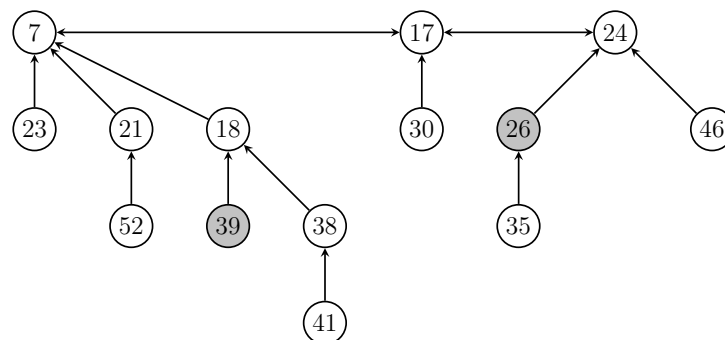
Task 1

Use Dijkstras algorithm to compute all shortest paths starting at node s .



Task 2

Given the following Fibonacci heap:



Perform the following operations:

delete-min, **decrease-key**("52", 9), **decrease-key**("46", 3), **insert**(42), **delete-min**, **decrease-key**("35", 7)

Task 3

Prove or disprove: The height of a Fibonacci heap of size n is at most $O(\log n)$.

Task 4

Let F_n be the n -th Fibonacci number ($F_1 = F_2 = 1$). Show that

$$\sum_{i=1}^n F_i^2 = F_n \cdot F_{n+1}$$

and

$$\sum_{i=1}^{2n+1} (-1)^{i-1} F_i = F_{2n} + 1.$$