

# Corrigé série 8

## Table des matières

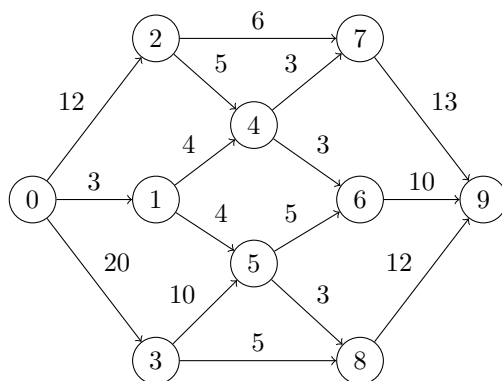
<b>1</b>	<b>Exercise 1</b>	<b>2</b>
1.1	Question A . . . . .	2
1.2	Question B . . . . .	8
<b>2</b>	<b>Exercise 2</b>	<b>16</b>
<b>3</b>	<b>Exercise 3</b>	<b>18</b>
3.1	Question A . . . . .	18
3.2	Question B . . . . .	18
3.3	Question C . . . . .	18
3.3.1	Prim . . . . .	18
3.3.2	Kruskal . . . . .	22
<b>4</b>	<b>Exercise 4</b>	<b>26</b>
4.1	Question A . . . . .	26
4.2	Question B . . . . .	27
<b>5</b>	<b>Exercise 5</b>	<b>29</b>

# 1 Exercise 1

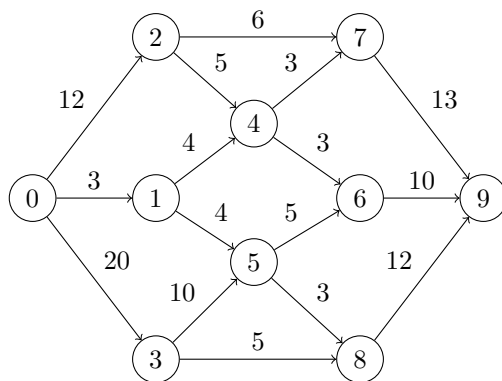
Note : les chemins qui mènent au puit destination sont marqués en rouge.

## 1.1 Question A

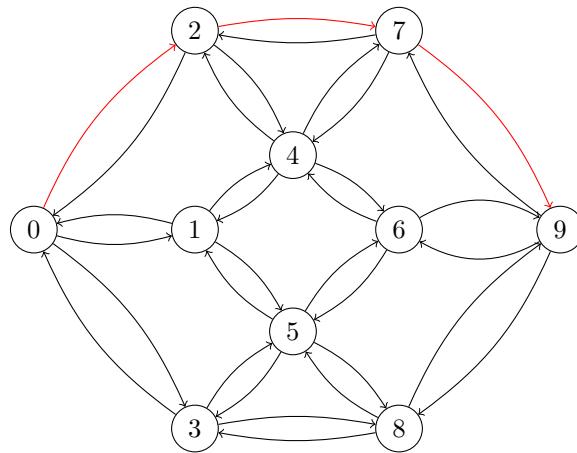
Graphe de départ :



$G$  :

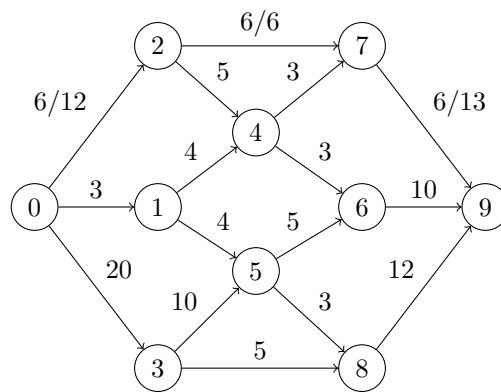


$G_{residuel}$  :

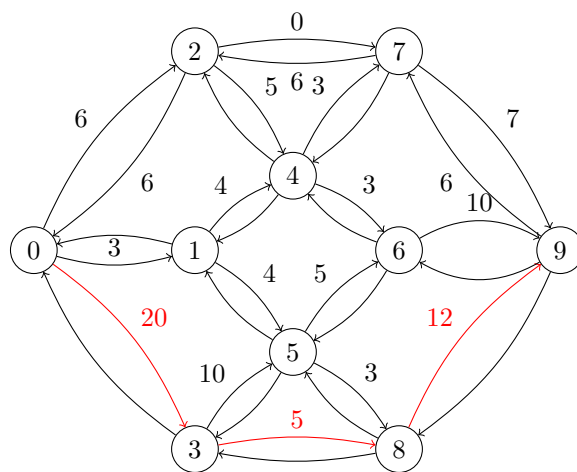


Flot maximal pour ce parcours : 6.

$G$  :

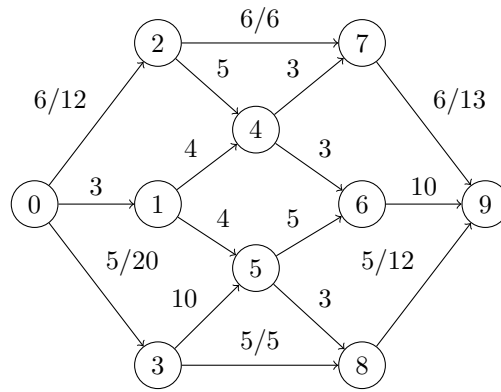


$G_{residuel}$  :

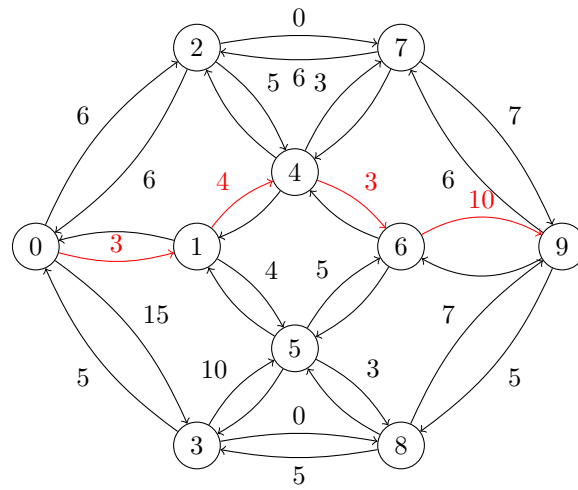


Flot maximal : 11.

$G$  :

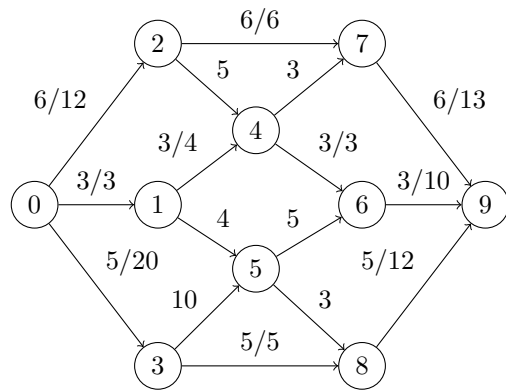


$G_{residuel}$  :

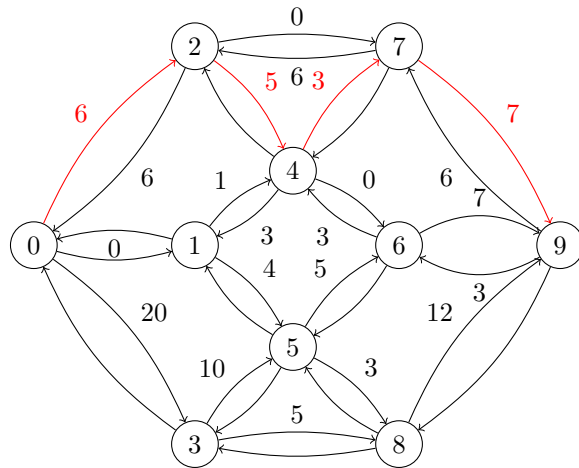


Flot maximal : 14

$G$  :

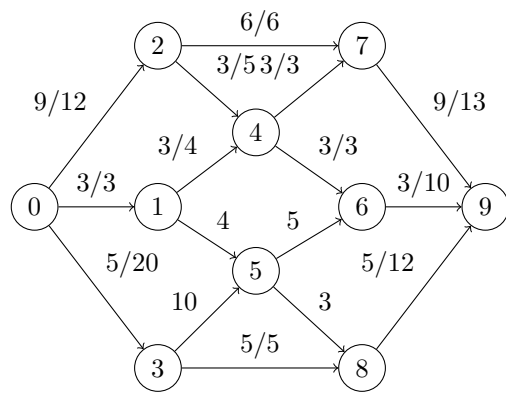


$G_{\text{residuel}}$  :

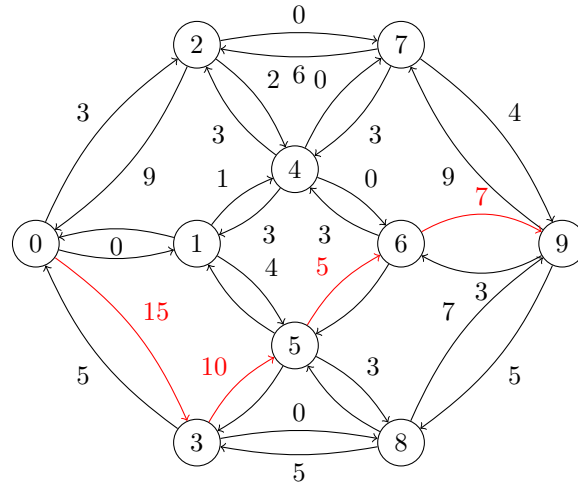


Flot maximal : 17

$G$  :

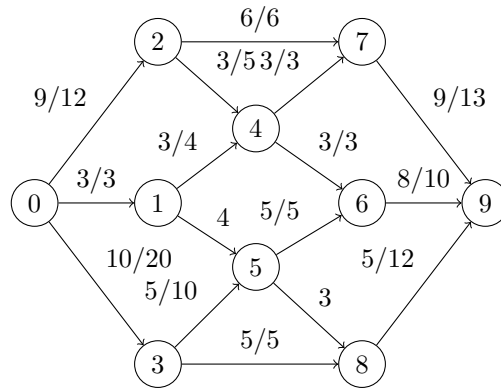


$G_{residuel}$  :

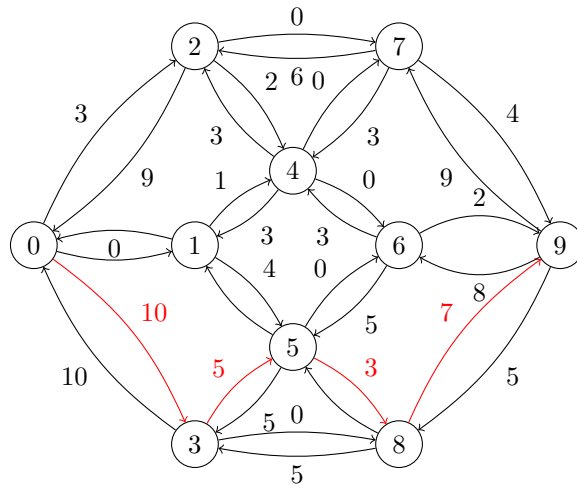


Flot maximal : 22

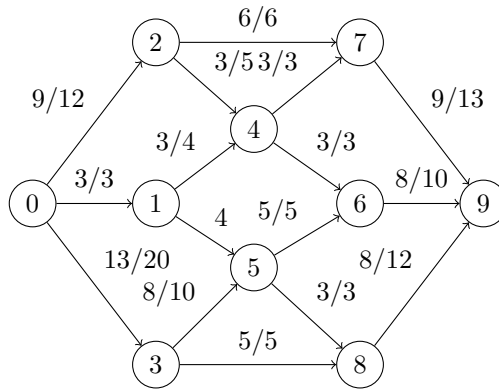
$G$  :



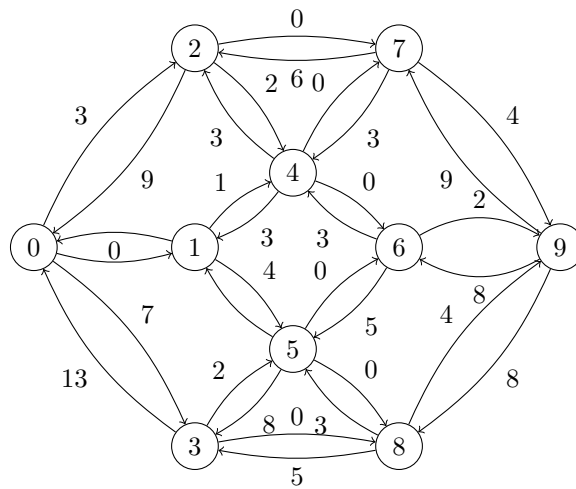
$G_{residuel}$  :



Flot maximal : 25.  
 $G$  :



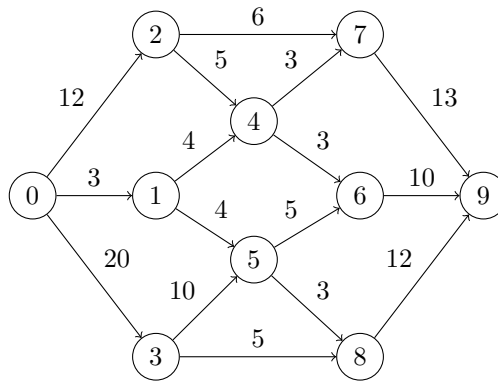
$G_{residuel}$  :



Remarque que dans ce parcours, il n'est plus possible d'atteindre le puit à partir de sa source et donc, le flot maximal est de 25.

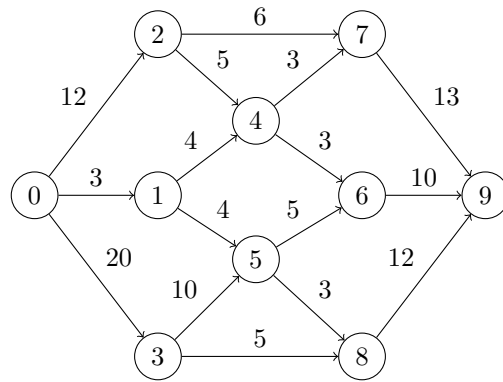
## 1.2 Question B

Graphe de départ :

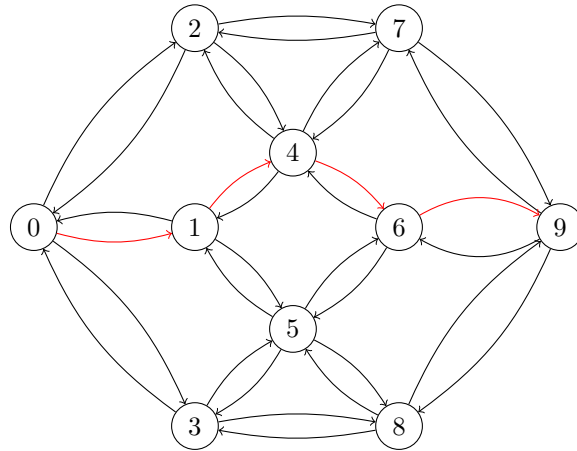


$G$  :



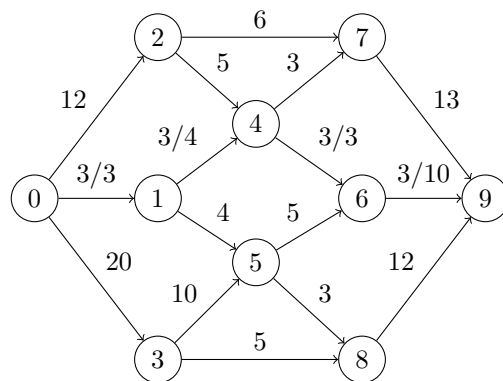


$G_{\text{residuel}}$  :

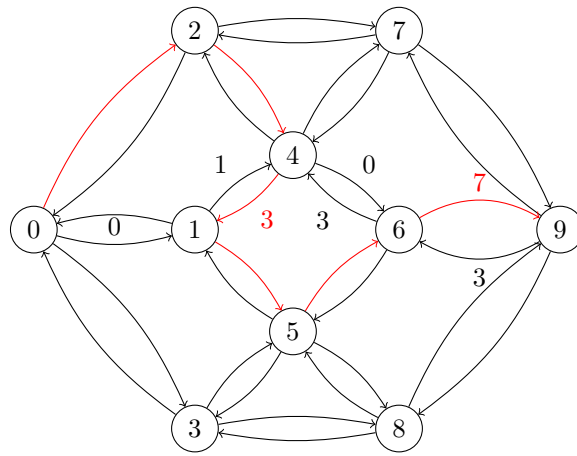


Flot maximal pour ce parcours : 3.

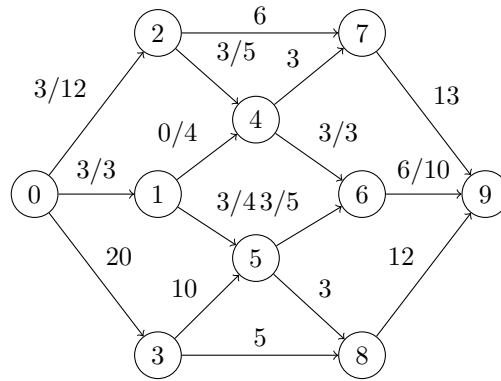
$G$  :



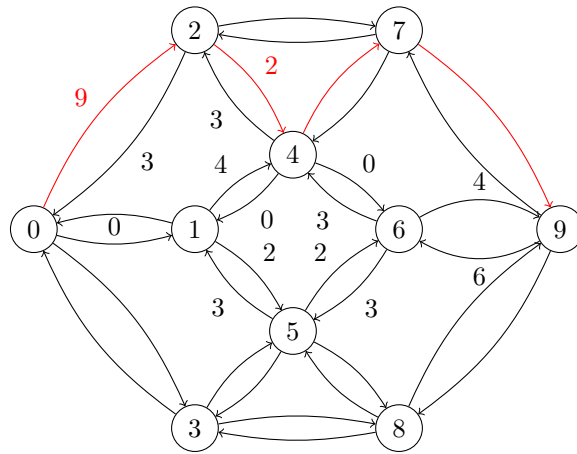
$G_{\text{residuel}}$  :



Flot maximale : 6  
 $G$  :

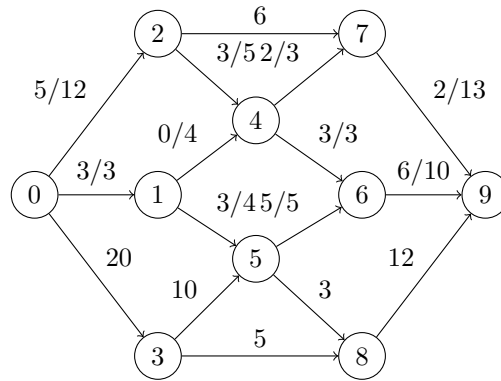


$G_{residuel}$  :

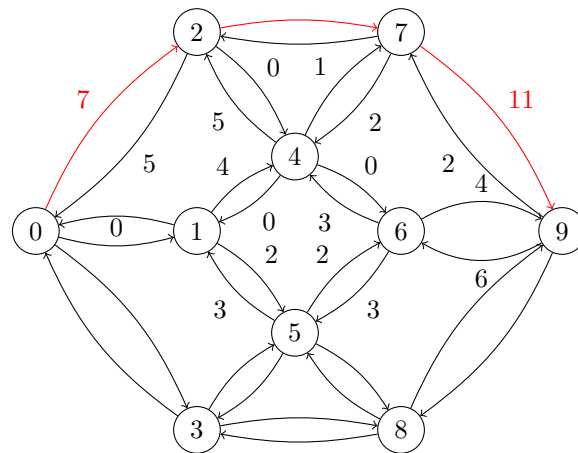


Flot maximale : 8

$G$  :

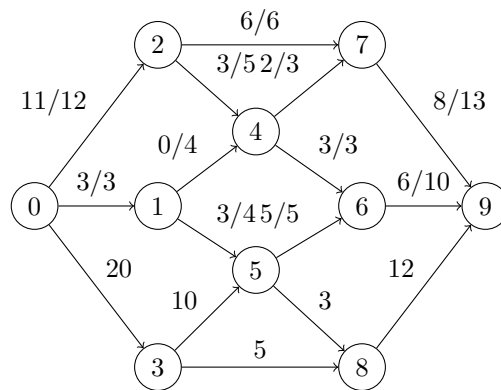


$G_{residuel}$  :

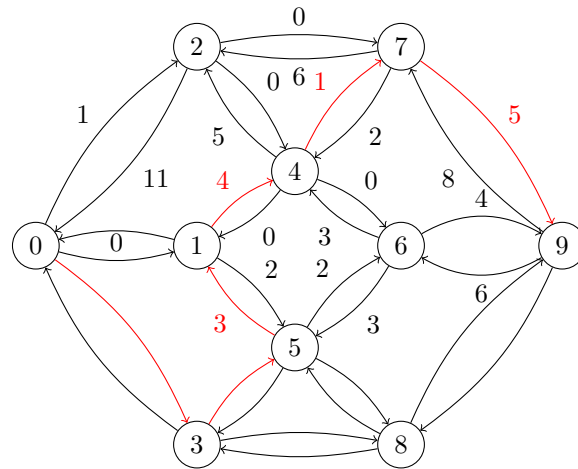


Flot maximal : 14

$G$  :

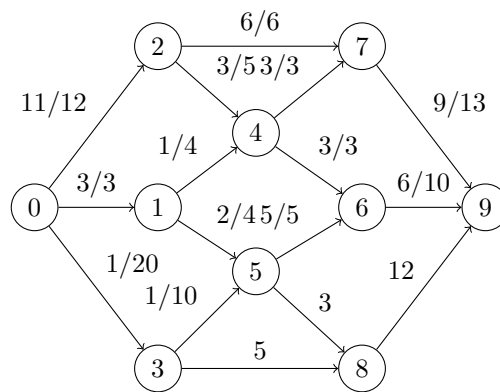


$G_{residuel}$  :

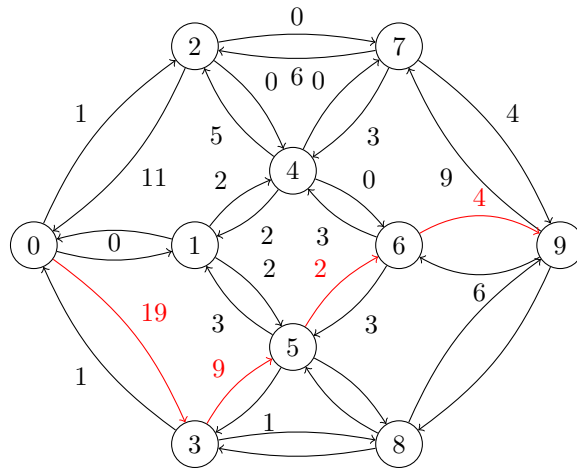


Flot maximal : 15

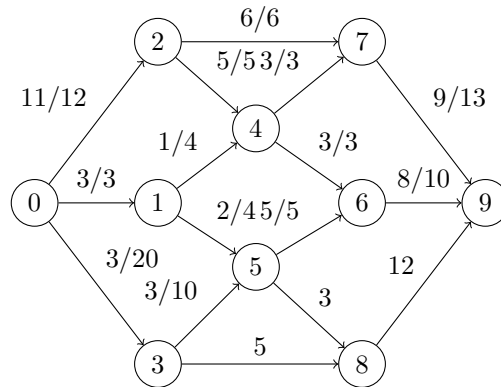
$G$  :



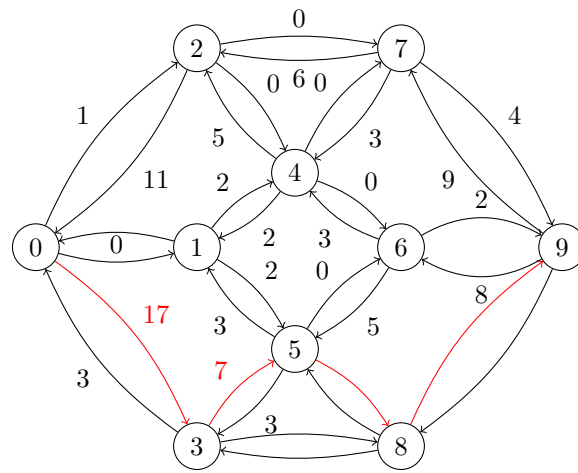
$G_{residuel}$  :



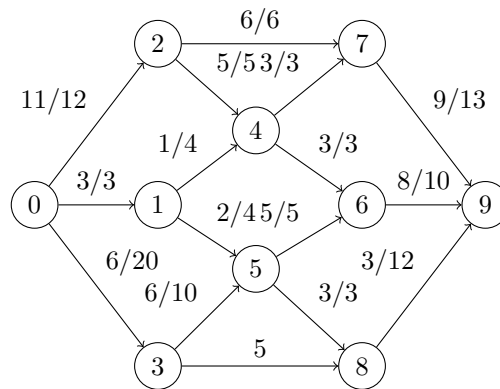
Flot maximal : 17  
 $G$  :



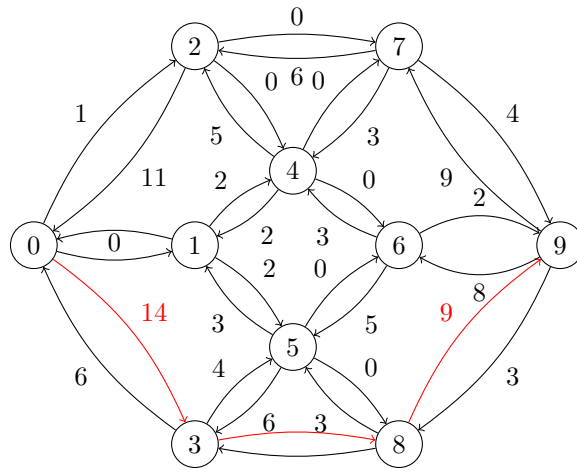
$G_{residuel}$  :



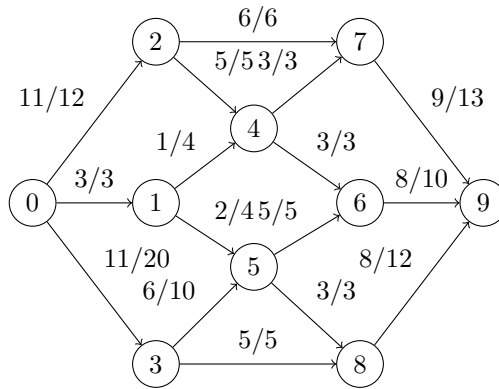
Flot maximal : 20  
 $G$  :



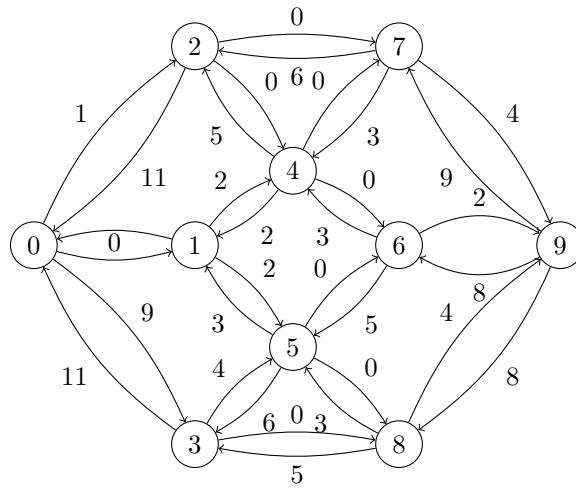
$G_{residuel}$  :



Flot maximal : 25.  
 $G$  :

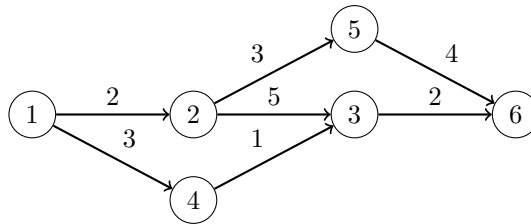


$G_{residuel}$  :

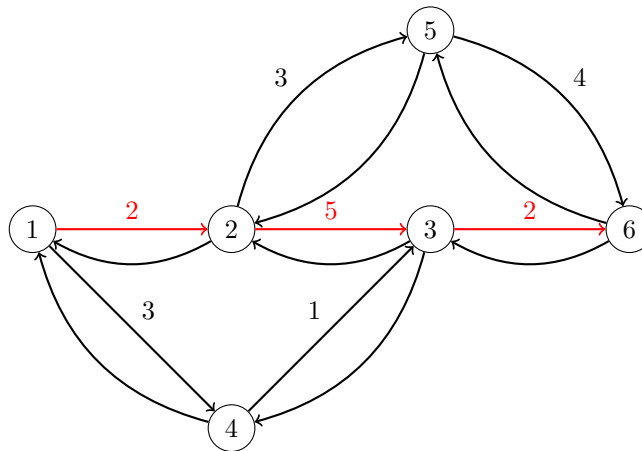


En tentant une nouvelle recherche en profondeur, il n'y a pas d'autre chemins possibles pour se rendre au puit en partant de la source. Donc, le flot maximal est de 25.

## 2 Exercice 2

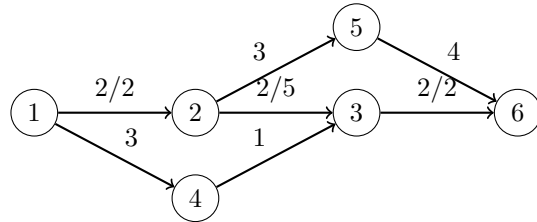


$G$  résiduel :

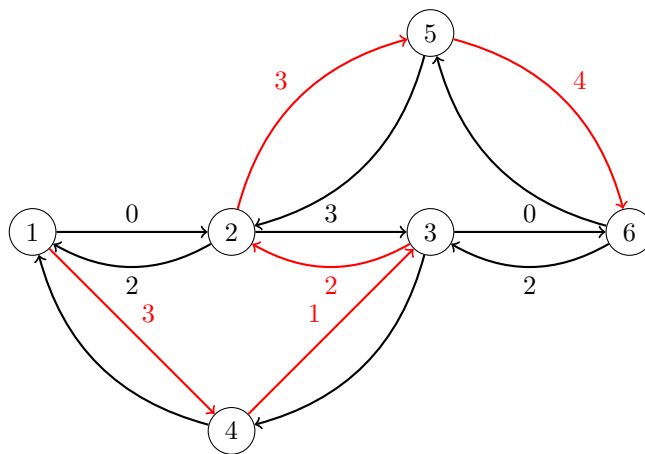




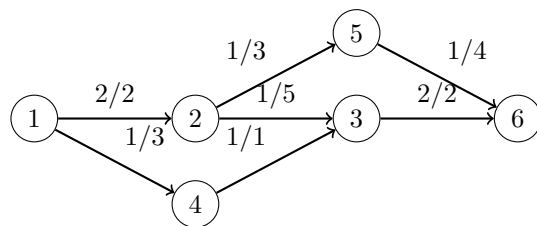
Flot maximal : 2



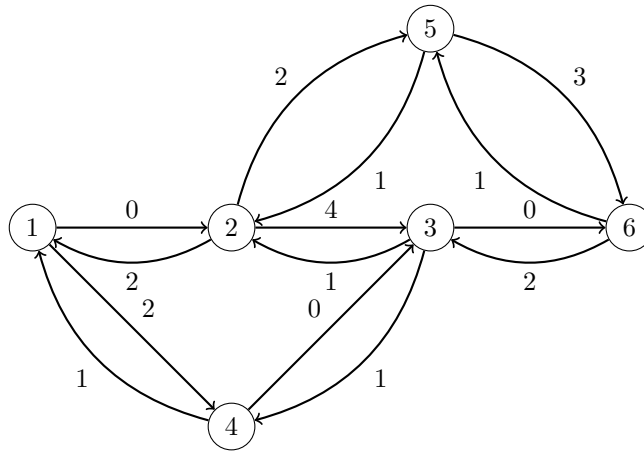
$G$  résiduel :



Flot maximal : 3



$G$  résiduel :



Il n'y a plus de chemins possibles qui se rend à 6 si on part de 1 et donc, le flot maximal est de 3.

### 3 Exercise 3

#### 3.1 Question A

Ordre de visite : 1, 2, 4, 3, 6, 5

	1	2	3	4	5	6
Parent	Null	1	4	2	6	3
Distance	0	25	60	45	102	72

#### 3.2 Question B

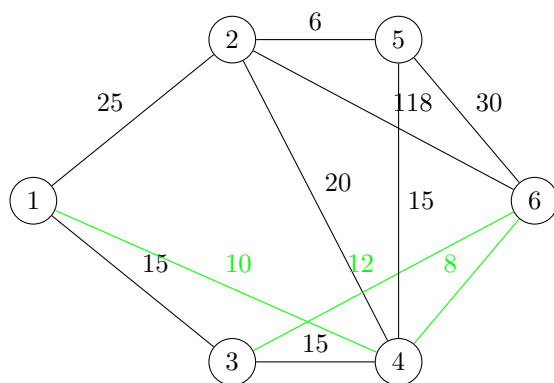
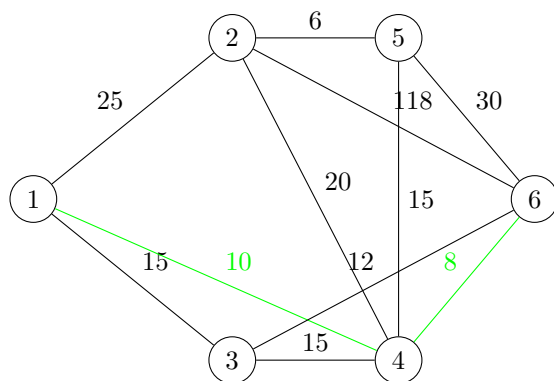
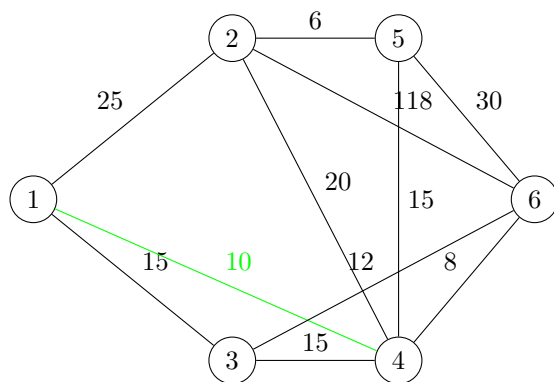
Ordre visite : 1, 2, 3, 4, 6, 5

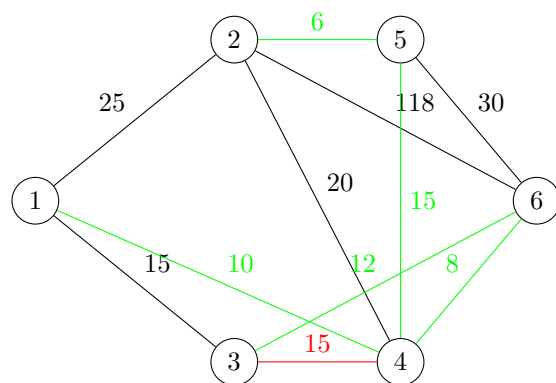
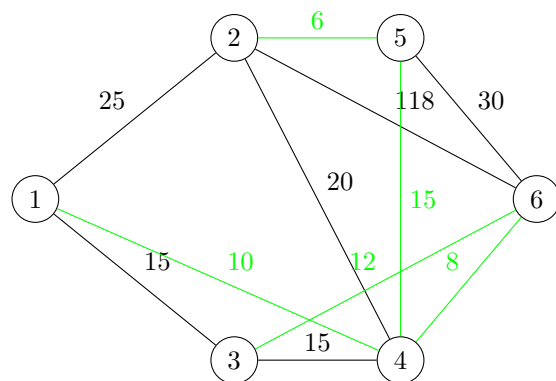
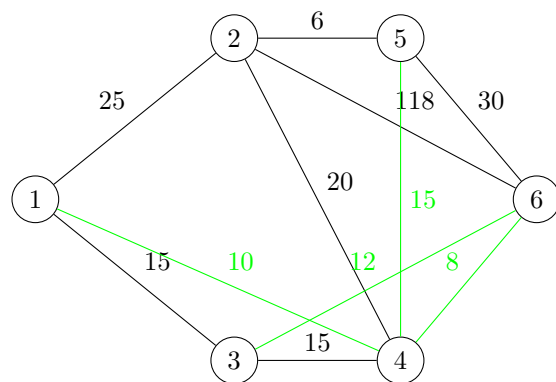
	1	2	3	4	5	6
Parent	Null	1	1	2	2	2
Distance	0	25	15	45	60	143

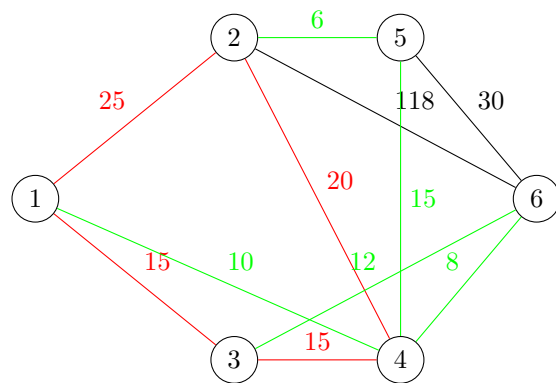
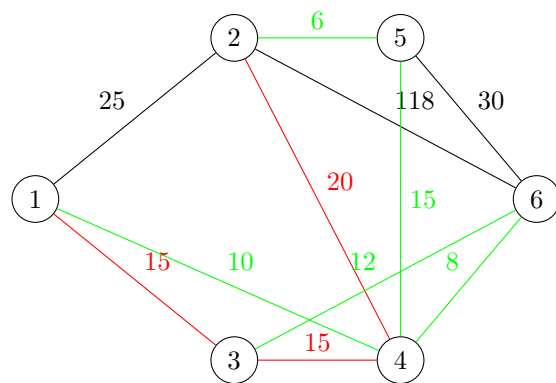
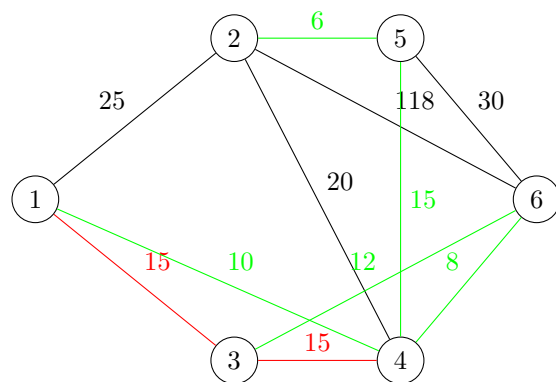
#### 3.3 Question C

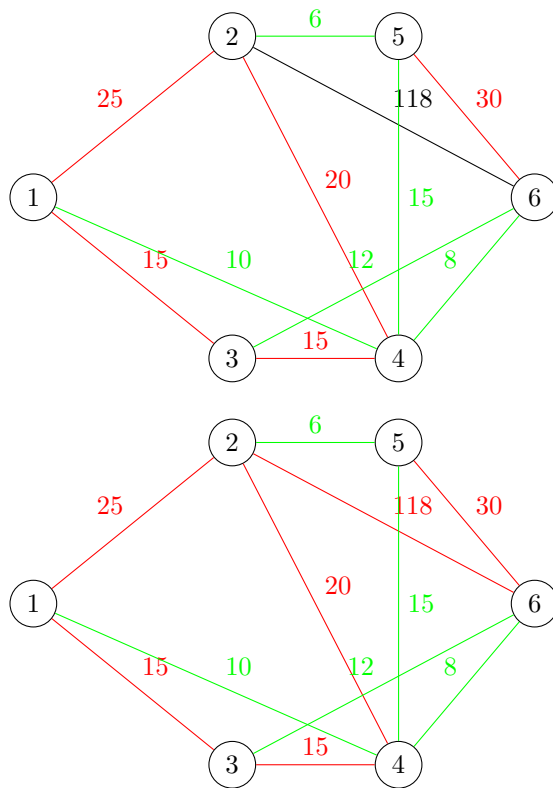
##### 3.3.1 Prim

Note : les arrêts appartenant dans l'arbre de recouvrement minimal seront en verts sinon en rouges.





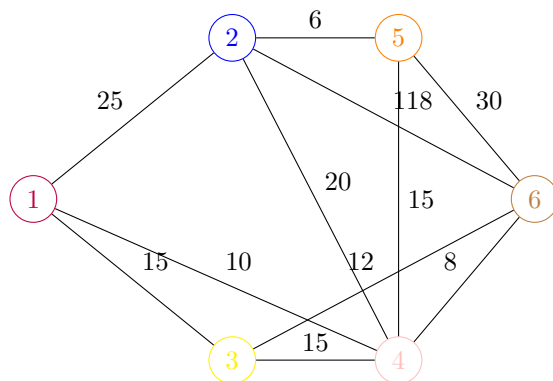


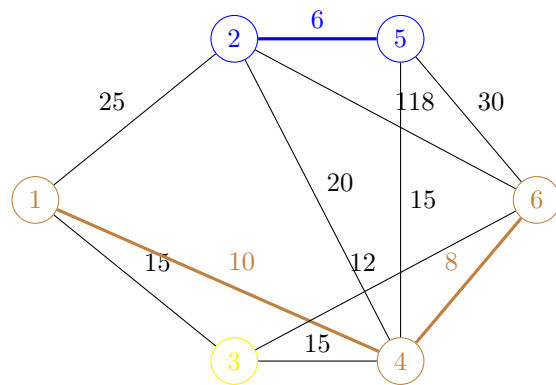
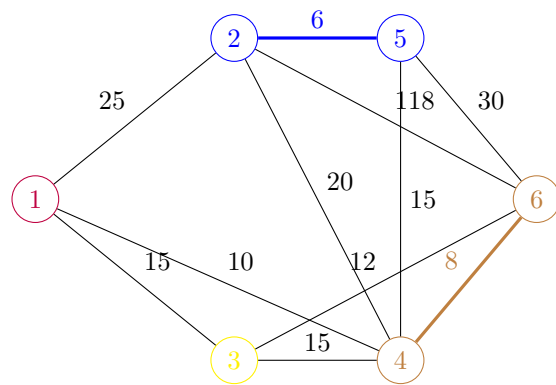
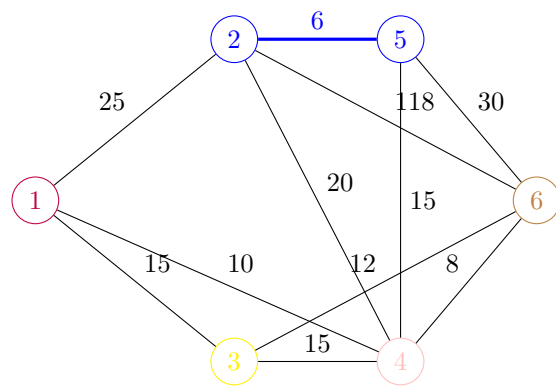


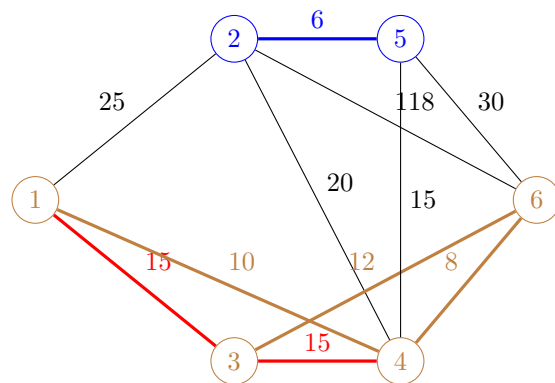
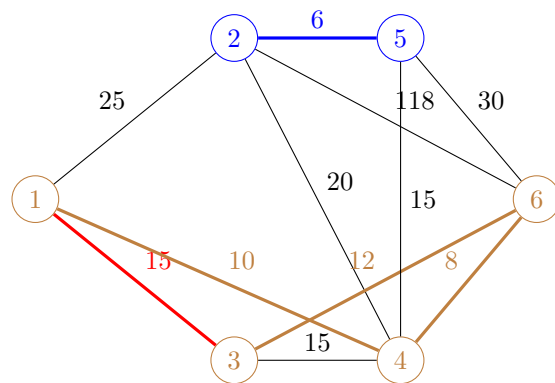
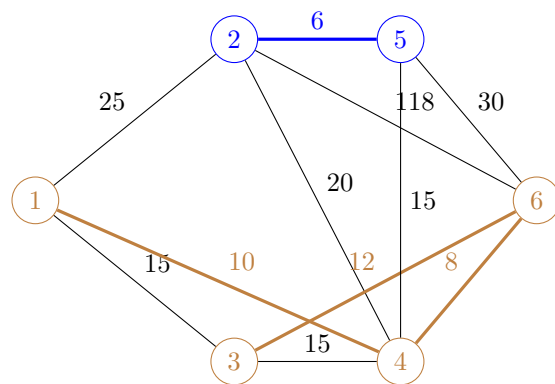
Le coût de pour construire l'arbre de recouvrement minimal est de 51.

### 3.3.2 Kruskal

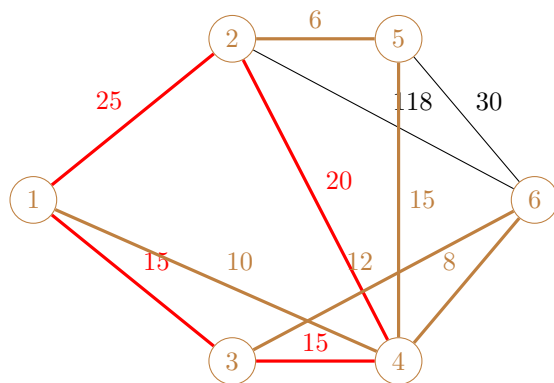
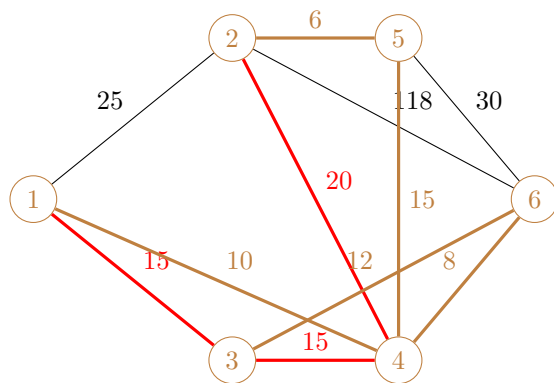
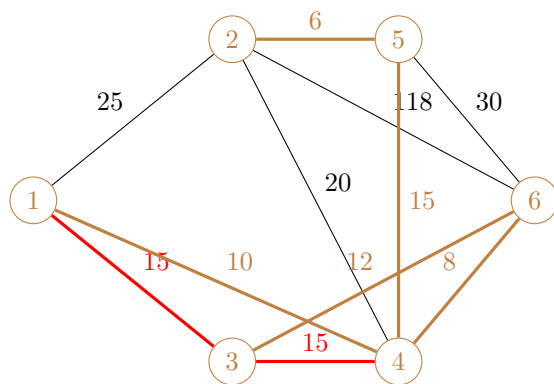
Chaque ensemble (singleton ou nouvel ensemble) seront caractérisés par une couleur pour le(s) sommet(s). Les arrêts en rouge signifient qu'il est impossible de faire l'union de deux ensembles.

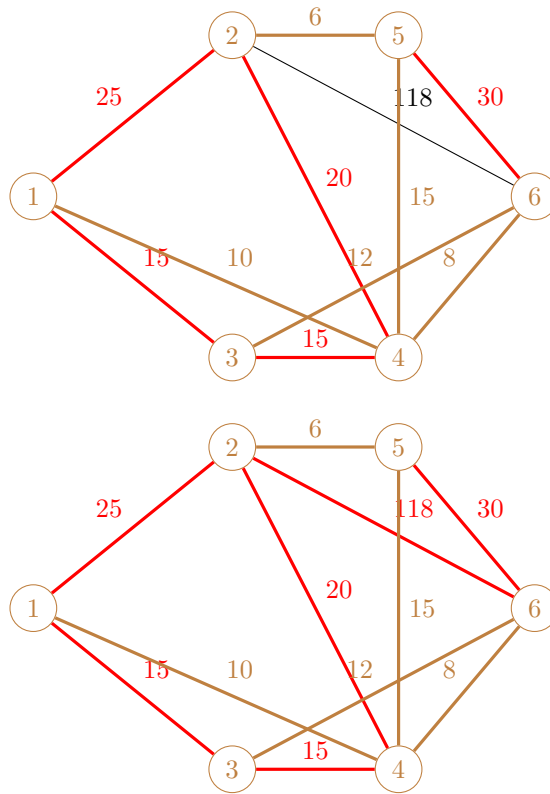








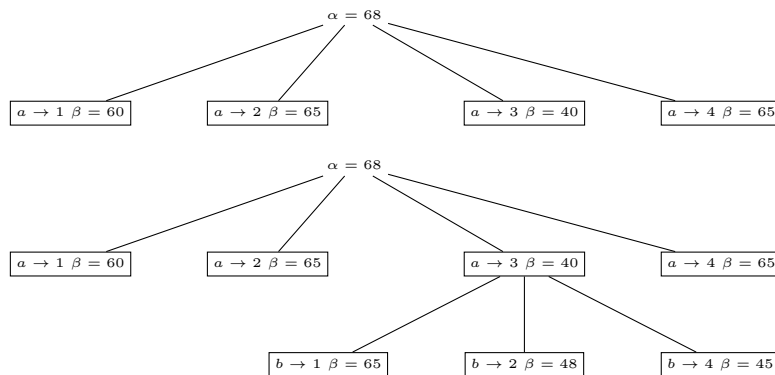


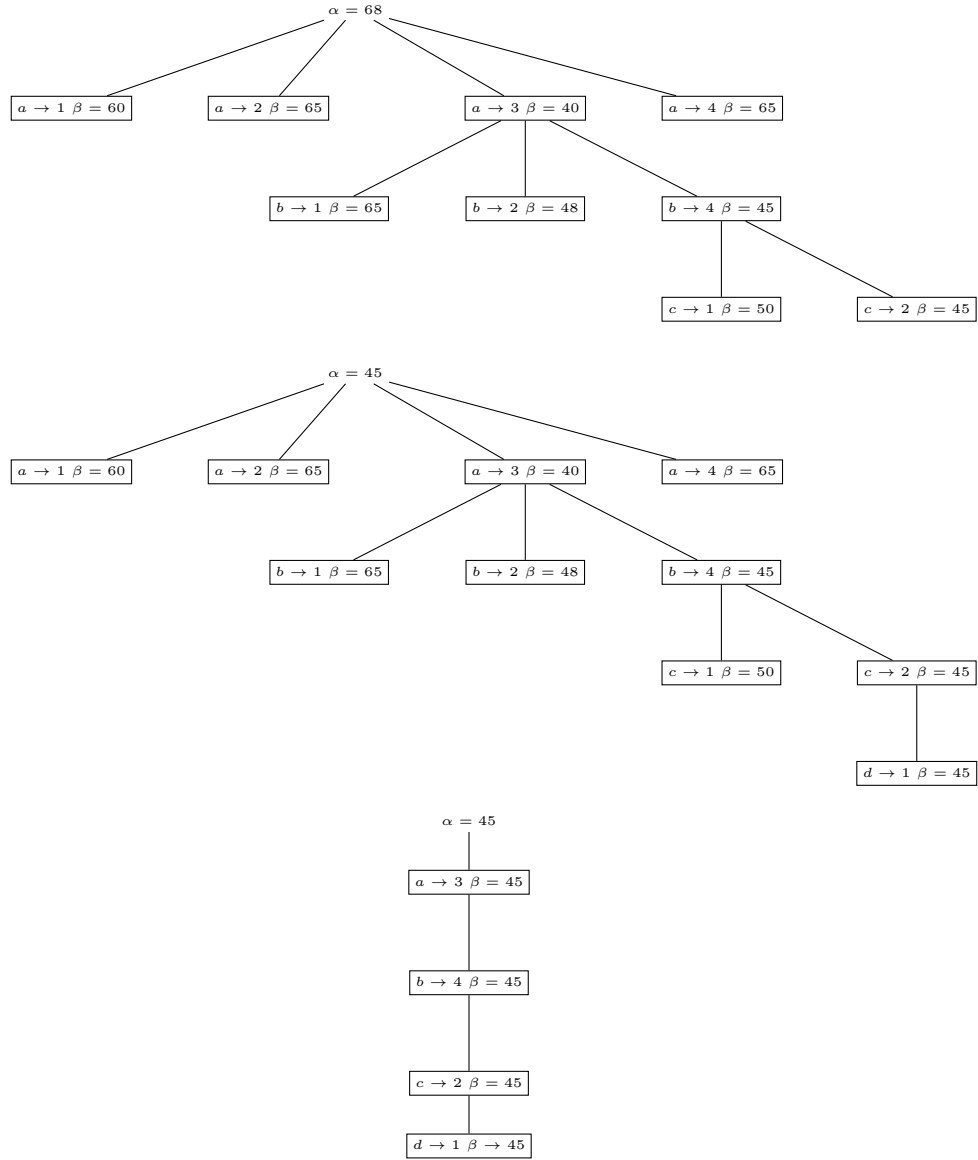


Coût de l'arbre de recouvrement minimal : 51

## 4 Exercise 4

### 4.1 Question A





Attribution des tâches :  $a \rightarrow 3$ ,  $b \rightarrow 4$ ,  $c \rightarrow 2$ ,  $d \rightarrow 1$ .

Coût : 45.

## 4.2 Question B

Avec une approche gloutonne, on aurait l'attribution des tâches suivantes :

$a \rightarrow 3, b \rightarrow 4, c \rightarrow 2, d \rightarrow 1$  pour un coût de 45. Le nombre de feuilles parcourus est de 1 si on inclut l'assignation via l'algorithme glouton.

## 5 Exercise 5

Solution possible :

1. **Fonction** ESTARBRE( $G$ )
2.     feuilles  $\leftarrow \{\emptyset\}$
3.     nbSommets  $\leftarrow |G.sommets|$
4.     estEnBoucle  $\leftarrow faux$
5.     Tant que nbSommets  $> 2 \wedge \neg$  estEnBoucle faire
6.         feuillesTemp  $\leftarrow \{\emptyset\}$
7.         Pour  $s \in G.sommets$  faire
8.             Si  $s \notin$  feuilles alors
9.                 voisins  $\leftarrow 0$
10.                 Pour  $v \in G.successeurs(s)$  faire
11.                     Si  $v \notin$  feuilles alors
12.                         voisins  $\leftarrow$  voisins  $+ 1$
13.                 Fin Si
14.             Fin Pour
15.             Si voisins  $\leq 1$  alors
16.                 feuillesTemp  $\leftarrow$  feuillesTemp  $\cup \{s\}$
17.             Fin Si
18.         Fin Pour
19.         Si |feuillesTemp|  $= 0$  alors
20.             estEnBoucle  $\leftarrow vrai$
21.         Sinon
22.             nbSommets  $\leftarrow$  nbSommets - |feuillesTemp|
23.             feuilles  $\leftarrow$  feuilles  $\cup$  feuillesTemp
24.         Fin Si
25.     Fin Pour
26.     Renvoyer nbSommets  $\neq 0 \wedge$  nbSommets  $\leq 2 \wedge \neg$  estEnBoucle
27. Fin Fonction