Homework 8

Item	weight	Benifit
1	3	12
2	5	25
3	7	35

Stage 3

			Total
$f_3(10)$	1 item	35 reward	35
$f_3(9)$	1	35	35
$f_3(8)$	1	35	35
$f_3(7)$	1	35	35
$f_3(6)$	0	0	0
⋮	⋮	⋮	⋮

$f_3(0)$	0	0	0

$f_2(10)$	2	25	50
$f_2(9)$	1	25	25
$f_2(8)$	1	25	25
$f_2(7)$	1	25	25
$f_2(6)$	1	25	25
$f_2(5)$	1	⋮	⋮
⋮	⋮		
$f_2(0)$	0	0	0

$f_1(10)$	3	12	36
$f_1(9)$	3	12	36
$f_1(8)$	2	12	24
$f_1(5)$	1	12	12
$f_1(0)$	0	0	0

Stage 2

$f_2(10)$

items	Current	future	Total
2	50	$f_3(0)=0$	50
1	25	$f_3(5)$	25
0	0	$f_3(10)=35$	35

$f(9)$

1	25	$f_3(4)=0$	25
0	0	$f_3(10)=35$	35

$f_2(8)$	1	25	$f_3(2)=0$	25
	0	0	$f_3(10)=25$	35
$f_2(7)$	1	25	$f_3(3)=0$	25
	0	0	$f_3(10)=35$	25
$f_2(6)$	1	25	$f_3(4)=0$	25
	0	0	$f_3(10)=35$	35
$f_2(5)$	1	25	$f_3(5)=0$	25
⋮				
$f_2(0)$	0	0	$f_3(10)=35$	35

first stage

$f_1(10)$

3	36	+	$f_2(1) = 0$	36
2	24	+	$f_2(4) = 0$	24
1	0	+	$f_2(9) = 25$	25

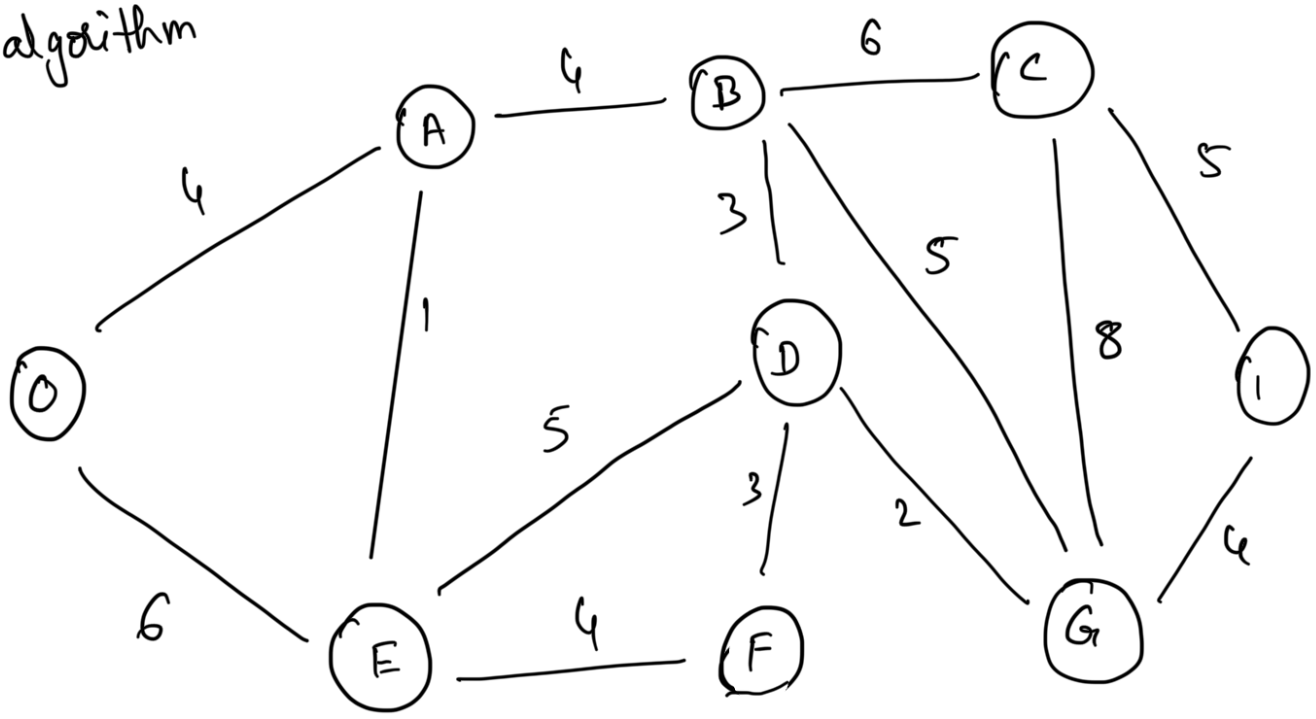
a) Max rewards is by choosing

$$f_2(10) = 25 + 25 = 50$$

b) If we have to choose only one item of a weight

$$f_3(7) + f_1(3) = 47$$

2) Shortest path from 0 to 1 in Dijkstra's algorithm



	A	B	C	D	E	F	G	I
0	4	int	inf	inf	6	inf	inf	inf
A	4	8	8	inf	5	inf	inf	inf
E	4	8	8	10	5	9	inf	inf
B	4	8	14	10	5	9	inf	inf
F	4	8	14	10	5	9	inf	inf
D	4	8	14	10	5	9	12	inf
G	4	8	14	10	5	9	12	16

C 4 8 14 10 5 9 12 16

The shortest path is

O → A → E → D → G → I = 16