HW Set 10

These were 7.5.4, 7.6.3, 7.6.4, 8.2.2, 8.2.7

7.5.4 We're told that we have three people for 4 jobs. Persons 2 and 3 may each take 2 jobs- To schedule this, we will have workers 1, 2, 2', 3, 3', where 2',3' are the second jobs. But this gives us 5 "people", so we need 5 jobs- We'll add a dummy job with zero cost:

	1	2	3	4	dummy
1	50	46	42	40	0
2	51	48	44	M	0
$2'$	51	48	44	M	0
3	M	47	45	45	0
$3'$	M	47	45	45	0

We should find that: Person 1 is assigned to 4, Person 2 is assigned to 1, 3 and Person 3 is assigned to job 2, for a total cost of $182.

7.6.3-4 The first tableau isn't a big change from 7.6.2- We're just crossing out some possibilities.

	Mob	Gal	NY	LA	Dum	
W 1	22	23	M	M	0	150
W 2	27	22	M	M	0	200
Mob	0	6	16	17	0	350
Gal	6	0	14	16	0	350
NY	M	M	0	15	0	350
LA	M	M	15	0	0	350
	350	350	490	510	50	

The idea is that Mobile and Galveston now are maxed out at 180, 150 respectively.

	Mob	Gal	NY	LA	Dum	
W 1	22	23	M	M	0	150
W 2	27	22	M	M	0	200
Mob	0	6	16	17	0	180
Gal	6	0	14	16	0	150
NY	M	M	0	15	0	s
LA	M	M	15	0	0	s
	180	150	$140+s$	$160+s$	50	

where $s = 330$.

8.2.2 For the Dijkstra algorithm, we have:

	1	2	3	4	5
1	$\boxed{0_1}$	2_1	8_1	∞_1	∞_1
2		$\boxed{2_1}$	7_2	6_2	14_2
4			7_2	$\boxed{6_2}$	14_2
3			$\boxed{7_2}$		14_2
5					$\boxed{14_2}$

This tells us that the shortest length to node 5 is 14 units, and we get that by taking either $1 \to 2 \to 5$.

8.2.7 The chart of costs would be the following where (i, j) represents C_{ij}:

–	208	258	355	537	841
–	–	228	278	375	557
–	–	–	248	298	395
–	–	–	–	288	338
–	–	–	–	–	338

This leads to the Dijkstra algorithm, we have:

	1	2	3	4	5	6
1	$\boxed{0_1}$	208_1	258_1	355_1	537_1	841_1
2		$\boxed{208_1}$	258_1	355_1	537_1	765_2
4			$\boxed{258_1}$	355_1	537_1	653_3
3				$\boxed{355_1}$	537_1	653_3
5					$\boxed{537_1}$	653_3
6						$\boxed{653_3}$

This tells us that the shortest length to node 6 is 653 units, and we get that by taking either $1 \to 3 \to 6$.

That is, we buy a car at the beginning, then trade it in after two years, and at the beginning of year 3, buy a new car.