H-W 4 SUBMTTED BY B00815433

1. $W = 35$

$S = \{ (i_1, 5, \$50), (i_2, 25, \$140), (i_3, 10, \$60) \}$

Weight	0	1	2	3	...	35
Max Profit{}	0	0	0	0	...	0

Weight	0	1	2	3	4	5	...	~~35~~ 35
Max Profit{}	0	0	0	0	0	0	...	0
Max Profit{i_1}	0	0	0	0	0	50	...	50

Weight	0	...	4	5	..	24	25	~~26~~	...	29	30	...	35
Max Profit{}	0		0	0	..	0	0		...	0	0	...	0
Max Profit{i_1}	0		0	50	..	50	50			50	50		50
Max Profit{i_1, i_2}	0		0	50		50	140		...	140	190	...	190

$$B[2,25] = \max\{B[1,25], B[1,(25-25)+140\}$$
$$= \max\{50, 0+140\} = \underline{\underline{140}}$$

$$B[2,30] = \max\{B[1,30], B[1,5]+140\}$$
$$= \max\{50, 190\}$$
$$= \underline{\underline{190}}$$

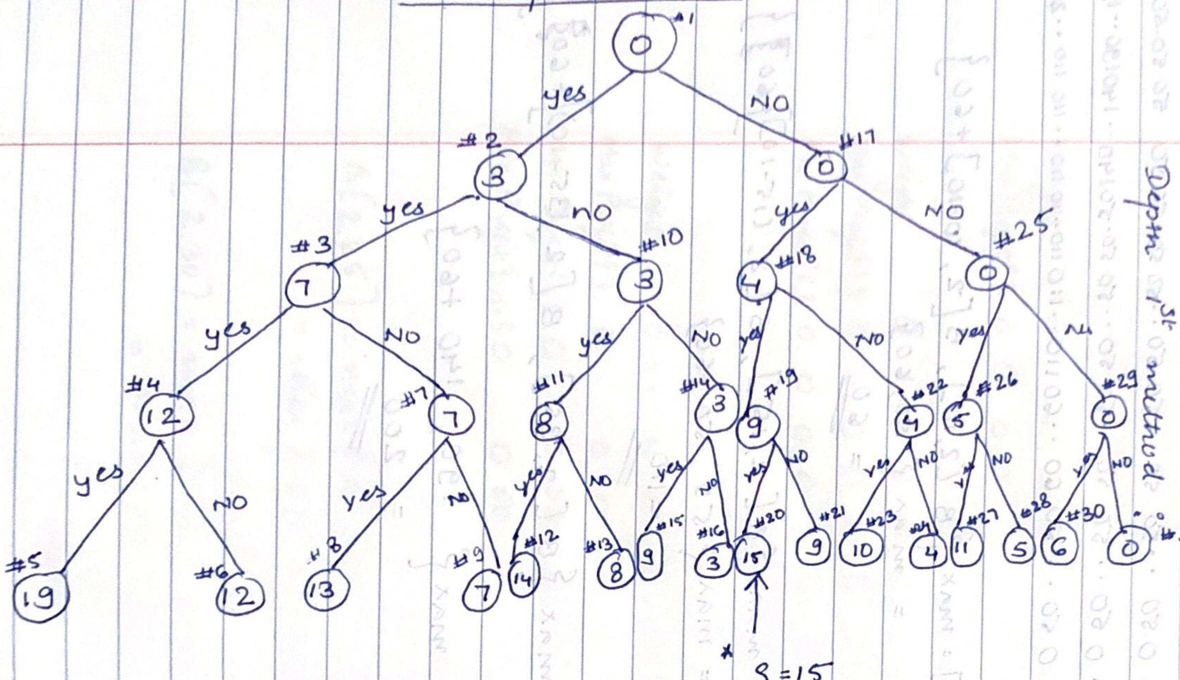
weight	0	4	5	9	10	14	15	19	20	24	25	29	30	35
Max Profit{ }	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Profit{i_1}	0	0	50	50	50	50	50	50	50	50	50	50	50	50
Max Profit{i_1, i_2}	0	0	50	50	50	50	50	50	50	50	140	140	190	190
Max Profit{i_1, i_2, i_3}	0	0	50	50	60	60	110	110	110	110	110	110	110	200

$$B[3,10] = \max\{B[2,10],\ B[2, 10-10] + 60\}$$
$$= \max\{50, 60\}$$
$$= \underline{\underline{60}}$$

$$B[3,15] = \max\{B[2,15],\ B[2, (15-10)] + 60\}$$
$$= \max\{50,\ 50+60\}$$
$$= \underline{\underline{110}}$$

$$B[3,35] = \max\{B[2,35],\ B[2, (35-10)] + 60\}$$
$$= \max\{190,\ 140+60\}$$
$$= \underline{\underline{200}}$$

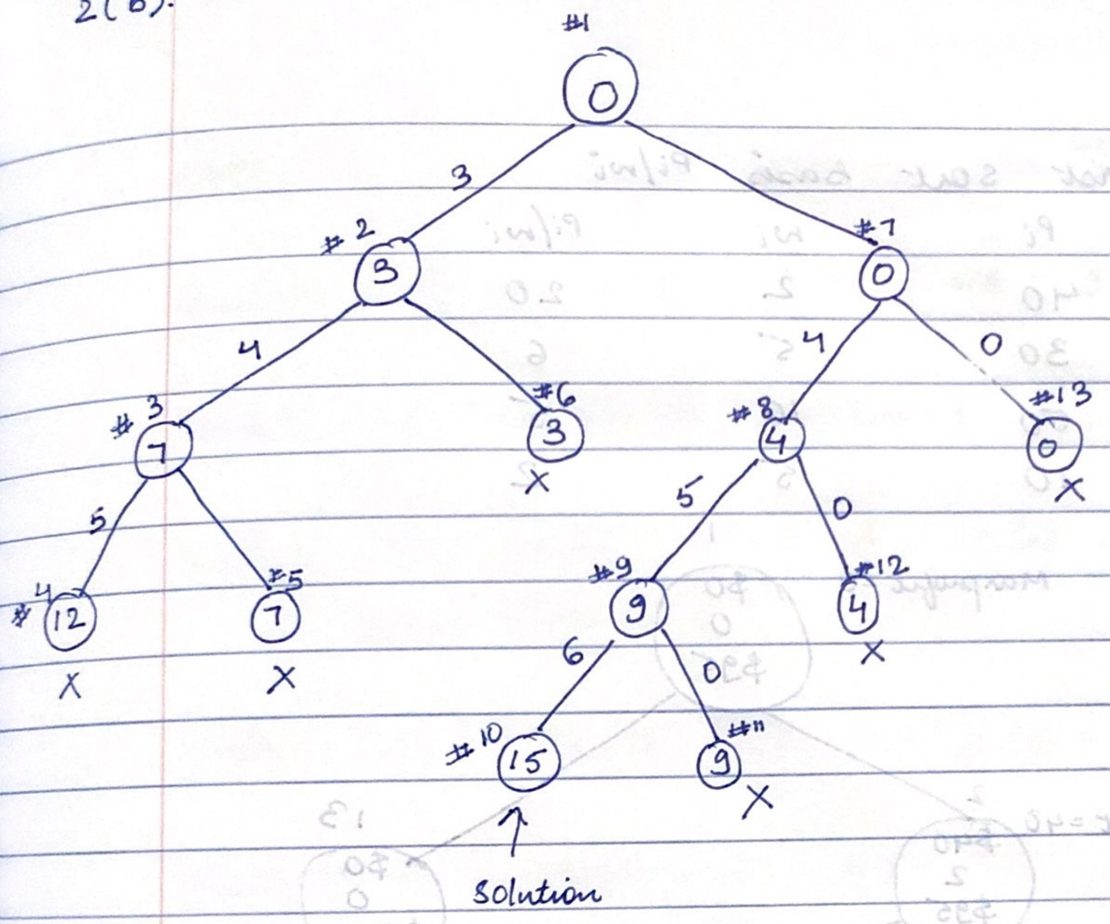
State space tree.



2. a. set {3, 4, 5, 6}, S = 15

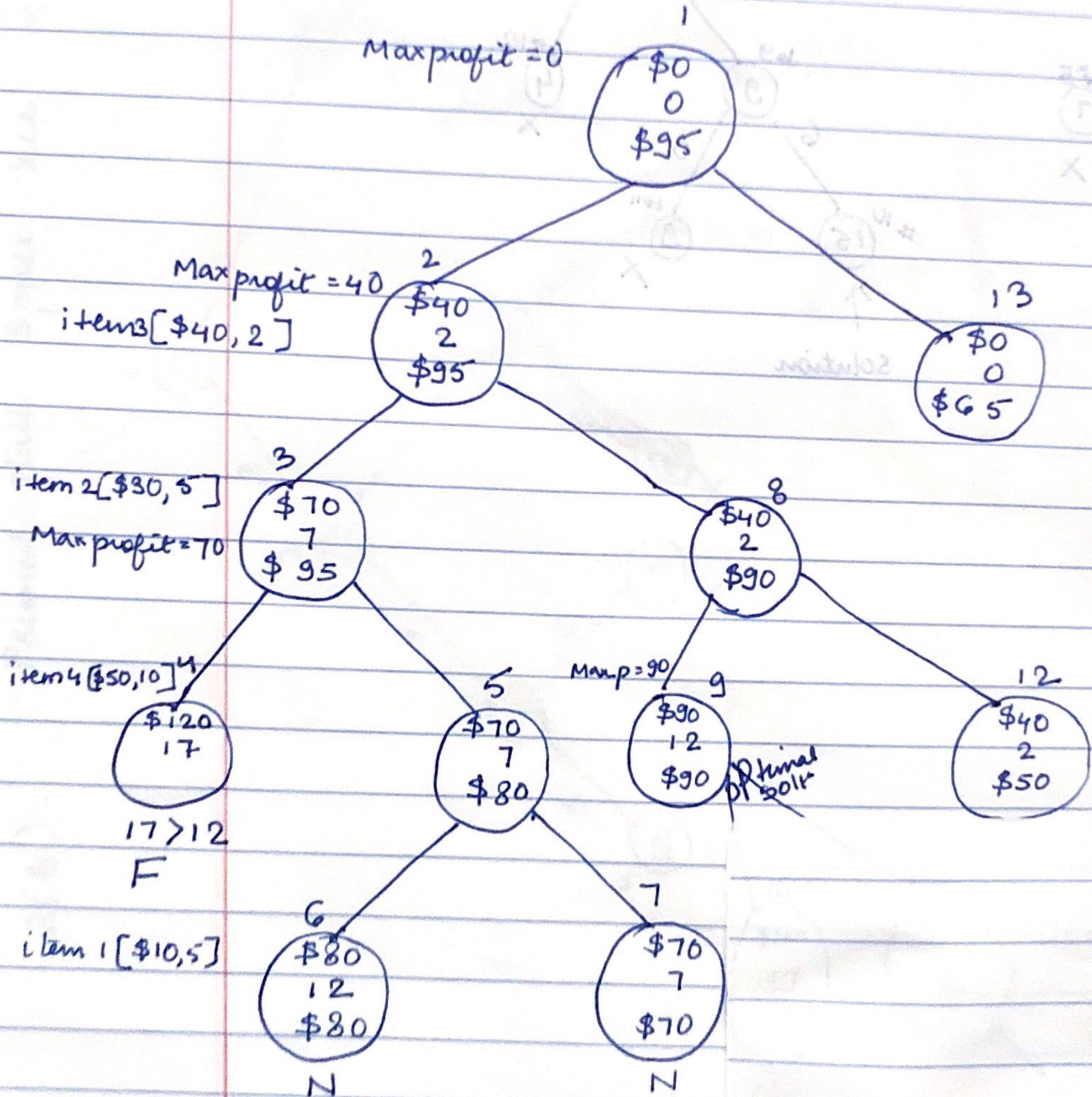
Depth 1st method:

2(b).



3. First sort basis Pi/wi

	Pi	wi	Pi/wi
3	40	2	20
2	30	5	6
4	50	10	5
1	10	5	2



Node 1 : $P_1 = 0$ $w_1 = 0$ ~~$C > w$~~ $UB = \underset{2}{40} + \underset{5}{30} + \underset{5}{25} = \$95$.

Node 2 : $P_2 = 40$ $w_1 = 2$ $C > w$ $\therefore UB = 95$

Node 3 : $P = 40 + 30 = 70$, $w = 2 + 5 = 7$ $\therefore UB = 95$

Node 4 : $P = 70 + 50$, $w = 7 + 10 = 17 > Cap$ $\therefore$ Not feasible
hence Backtrack

Node 5 : $P = 70$, $w = 7$, $UB = 40 + 30 + 10 = 80$.

Node 6 : $P = 40 + 70 + 10$, $w = 12$ $UB = 80$.

Node 7 : $P = 70$, $w = 7$ $UB = 70$.

Node 8 : $P = 40$, $w = 2$, $UB = 90$

Node 9 = $P = 90$, $w = 12$, $UB = 90$

Node 10 = $P = 110$, $w = 17$ Not feasible

Node 11 = $P = 90$, $w = 12$ $UB = \$90$

Node 12 : $P = 40$, $w = 2$, $UB = 50$

Node 13 : $P = \$0$, $w = 0$, $UB = 65$.

4. 6, 15, 34, 29, 28, 11, 21, 7, 0, 32, 30, 45

1. Linear probing:

Home Buckets = Key % 17.

6 mod 17 = 6

15 mod 17 = 15

34 mod 17 = 0

29 mod 17 = 12

28 mod 17 = 11

11 mod 17 = 11

21 mod 17 = 4

7 mod 17 = 7

0 mod 17 = 0

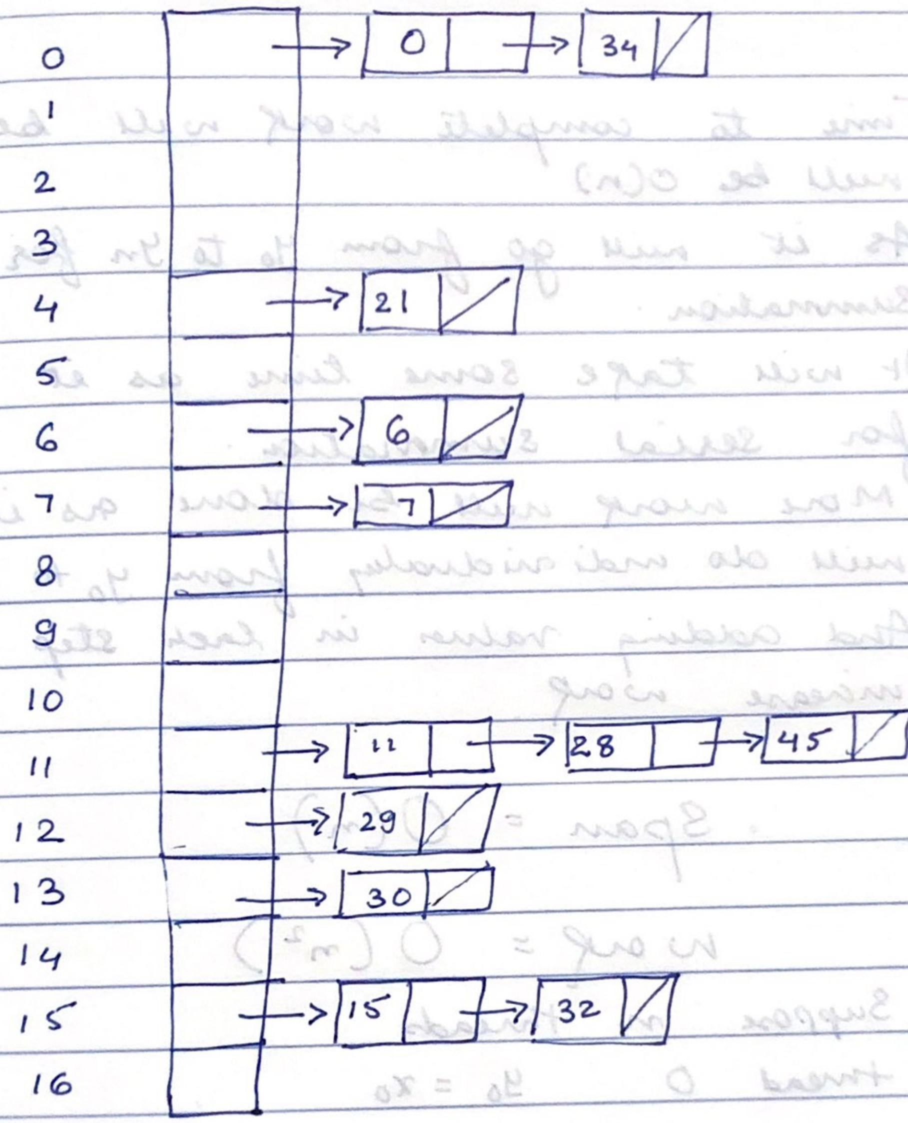
32 mod 17 = 15

30 mod 17 = 13

45 mod 17 = 11

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
34	0	45		21		6	7				28	29	11	30	15	32

2.



5.

- Time to complete work will be n, it will be O(n)
- As it will go from y_0 to y_n for summation.
- It will take some time as it takes for serial summation.
- More work will be done as it will do individualy from y_0 to y_n
- And adding values in each step will increase work.

$$\text{Span} = O(n)$$

$$\text{work} = O(n^2)$$

Suppose n threads

thread	0	$y_0 = x_0$	0
	1	$y_1 = x_0 + x_1$	1
	2	$y_2 = x_0 + x_1 + x_2$	2
	⋮		
	$n-1$	$y_{n-1} = x_0 + x_1 \dots x_{n-1}$	$n-1$

$$\frac{n(n-1)}{2}$$