Assign-5

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R.No - 20

(1) Let opt [j] be the revenue from the optimal subset of sites.

then,

$$opt[j] = \max[r_j + opt[e(j)], opt[j-1])$$

where

$e(j)$ is the eastern-most site from x_j such that

$$x_j - e(j) > 5 \text{ miles}$$

& r_j is the revenue of ith site

(a) <u>Algorithm</u>

```
opt [0] <- 0
opt [1] = r1,
j <- 2
while j <= n
    opt [j] = max [rj + opt [e[j]],
                   opt [j-1])
    j++
end
return M [n]
```

<u>Time Complexity</u>

$O(n) \rightarrow$ polynomial time

(b) $M = 20, \quad n = 4$

$\{x_1, x_2, x_3, x_4\} = \{6, 7, 12, 14\}$

$\{r_1, r_2, r_3, r_4\} = \{5, 6, 5, 1\}$

$opt[2] = \max\{6 + opt[0], 5\} = 6$

$opt[3] = \max[5 + opt[1], 6\} = 10$

$opt[4] = \max\{1 + opt[2], 10\} = 10$

* optimal revenue = 10
  optimal sites x_1, x_3.

(2) Given graph $G(V, E)$, we maintain a set $S \subseteq V$ on which a spanning tree has been constructed so far.

Algorithm

1) Pick an edge with Min. cost.
2) Keep selecting edge with next min cost as long as we form a cycle. If a cycle is formed we search for next edge.
3) This is done until we traverse through all edges.

* By this Approach we get MBE-ST (which is also called Kruskal's Algo^m)
* We also conclude that MST of a graph is also its MBEST.

(3) (a) the max^m element in the array $[1 \ldots n]$ & $i = n+1$

(b) the while loop is always executed n- times

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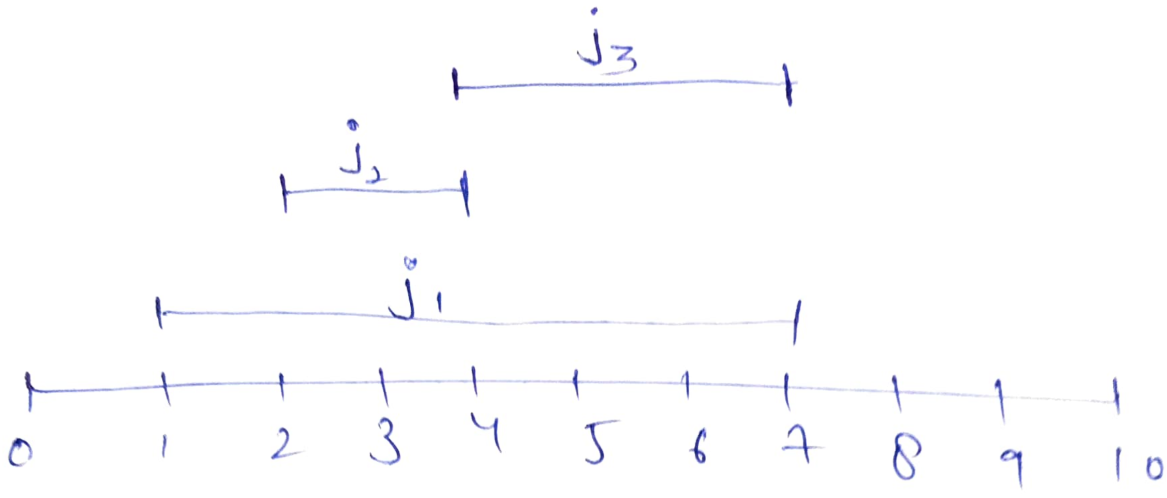

Algorithm picks j2 & j3 (duration = 5)
optimal is j_1 (duration = 6).

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