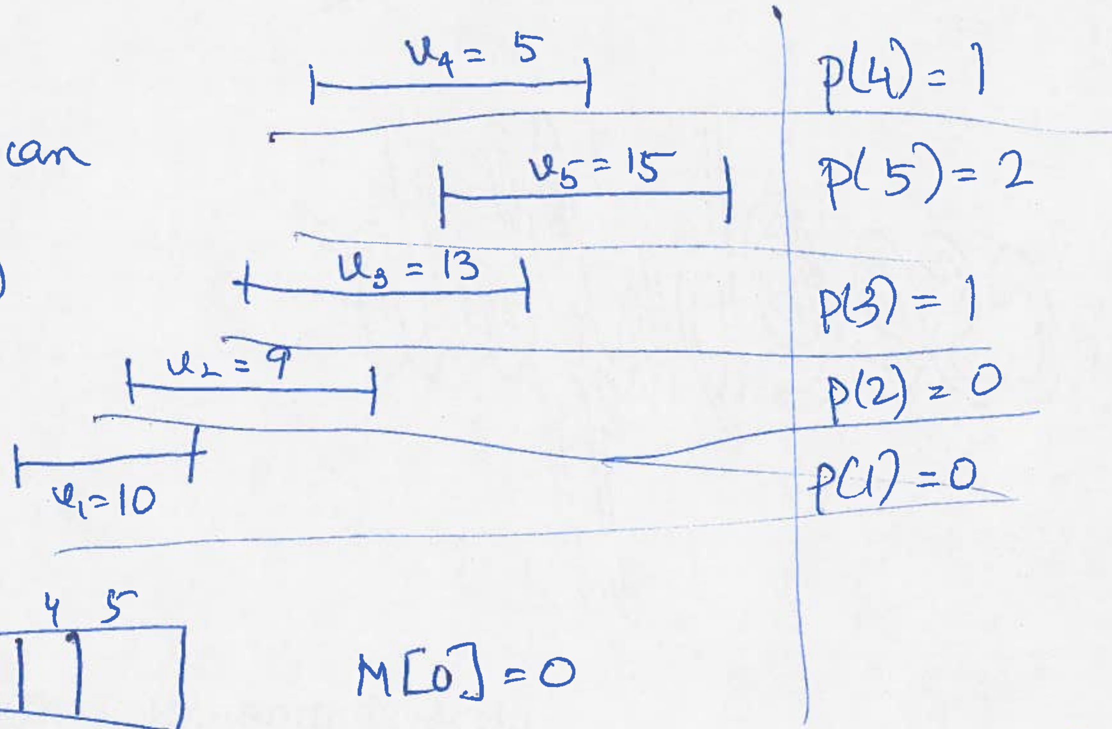
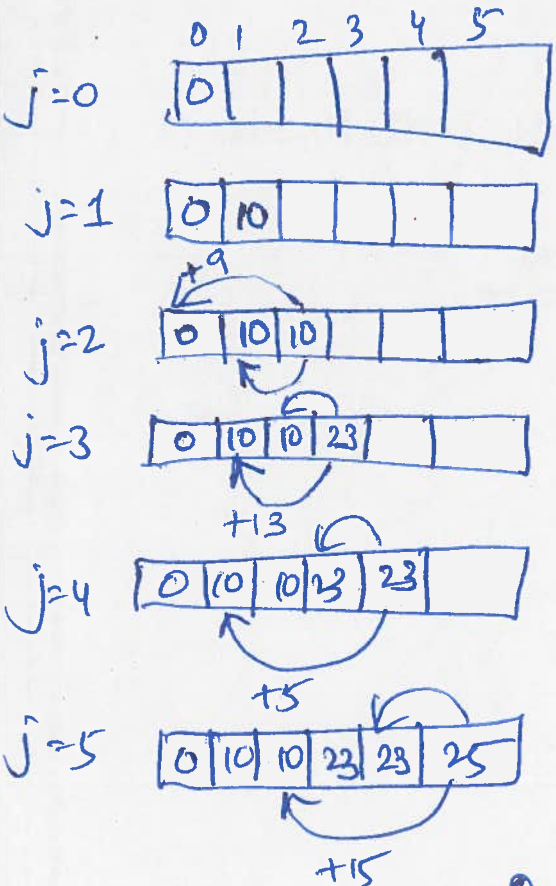
Nov 10

$$M[j] = \max\{v_j + M[p(j)],\ M[j-1]\}$$

Ex: Argue $p(j)$ values can be computed in $O(n \log n)$





$M[0] = 0$

$M[1] = \max\{v_1 + M[0],\ M[0]\}$

$= \max\{10+0,\ 0\} = 10$

$M[2] = \max\{9+0,\ 10\} = 10$

$M[3] = \max\{13+10,\ 10\} = 23$

$M[4] = \max\{5+10,\ 23\} = 23$

$M[5] = \max\{15+10,\ 23\} = 25$

$5 \overset{?}{\in} O_5$ ⇐ as $15+10 > 23$

$\Rightarrow 5 \in O_5$

$O_2 = O_5 \setminus \{5\} \subseteq [2]$

$2 \overset{?}{\in} O_2$ $\quad 2 \notin O_2$ as $10 > 9$

$O_1 = O_2 \setminus \{2\} \subseteq [1]$ $\quad 1 \in O$

$\Rightarrow O_5 = \{1, 5\}$

```
M-Schedule (n, M, p)
  If n == 0 , return {}
    If v_n + M[p[n]] > M[n-1]
      return {n} ∪ M-Schedule (p(n), M, p)
  else
      return M-Schedule (n-1, M, p)
```

$O(n)$ time