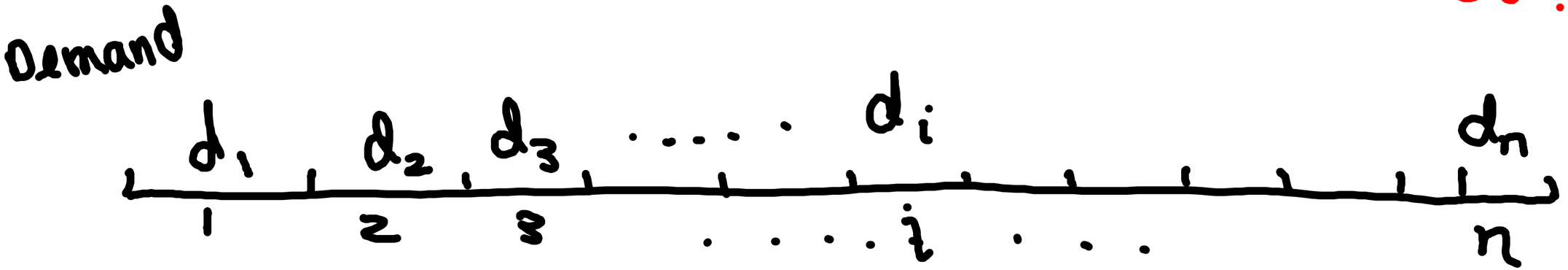
9/2/15

Production Scheduling

Which production schedule minimises total cost?



Demand must be met.

$c(x)$ = cost of making x units.

H = maximum amount you can hold for next period

E.g.

economies of scale

If $x_1 = x$ then I start next period with $x - d_1$ in stock.

The larger x, the cheaper it should be to fulfil the demand in periods $2, 3, \cdots, n$

To choose x I should minimise

$$c(x) + [\text{Cost of completion starting period 2 with } x - d_1 \text{ in stock}]$$

$f_r(i)$ = minimum cost of satisfying demand in periods $r, r+1, \dots, n$ starting with i in stock

$f_{n+1}(i) = 0 \quad \forall\, i$

$$= \min_{x} \Big[\underbrace{C(x)}_{\text{period } r \text{ cost}} + \underbrace{f_{r+1}(i + x - d_r)}_{\text{periods } r+1, \dots, n \text{ cost}} \Big]$$

$x + i - d_r \le H$

$x + i - d_r \ge 0$

$n=4;\ d_1=d_2=d_3=d_4=3;\ H=4;\ C(x)=x(20-x)$

i	r=1	r=2	r=3		r=4	(f,x)
0			84	6	51	3
1					36	2
2					19	1
3					0	0
4					0	0

$f_3(0) = \min$

$C(3) + 51 = 102$

$C(4) + 36 = 100$

$C(5) + 19 = 94$

$C(6) + 0 = 84$ ←

$C(7) + 0 = 91$