Q/ Given a chain ord 4 matrices A1, A2, A3, A4, with positions $P_0 = 5$, $P_1 = 4$, $P_2 = 6$, $P_3 = 2$, $P_4 = 7$

Find out the order of matrix multiplication

$A1 = 5 \times 4$)
$A2 = 4 \times 6$)
$A3 = 6 \times 2$)
$A4 = 2 \times 7$)

	1	2	3	4	
	0	120	88	158	1
		0	48	104	2
			0	84	3
				0	4

$(1,2) = 5 \times 4 \times 6 = 120$
$(2,3) = 4 \times 6 \times 2 = 48$
$(3,4) = 6 \times 2 \times 7 = 84$

$M(1,3) = \min \begin{cases} M[1,2] + M[3,3] + P_0 P_2 P_3 = 120 + 0 + 5 \cdot 6 \cdot 2 = \boxed{180} \\ M[1,1] + M[2,3] + P_0 P_1 P_3 = 0 + 48 + 5 \cdot 4 \cdot 2 = 88 \end{cases}$

$= 88$

$M(2,4) = \min \begin{cases} M[2,3] + M[4,4] + P_1 P_4 P_3 = 48 + 0 + 4 \cdot 2 \cdot 7 = 104 \\ M[2,2] + M[3,4] + P_1 P_4 P_2 = 0 + 84 + 4 \cdot 6 \cdot 7 = 252 \end{cases}$

$= 104$

$M(1,4) = \min \begin{cases} M[1,3] + M[4,4] + P_0 P_3 P_4 = 88 + 0 + 5 \cdot 2 \cdot 7 = \boxed{158} \\ M[1,2] + M[3,4] + P_0 P_2 P_4 = 120 + 84 + 5 \cdot 6 \cdot 7 = 414 \\ M[1,1] + M[2,4] + P_0 P_1 P_4 = 0 + 104 + 5 \cdot 4 \cdot 7 = 244 \end{cases}$

$= \boxed{158}$

Min = 158

$= M[1,3] + M[5,4]$

$= (A1 \times A2 \times A3) \times A4 \qquad M1 \times m2 \times (m3 \times m4)$

Q.2 Capacity = 10

item	1	2	3	4	5
weight	3	3	2	5	1
profit	10	15	10	12	8

| p/w | 3.33 | 5 | 5 | 2.4 | 8 |

index order

item	5	2	3	1	4
weight	1	3	2	3	5
profit	8	15	10	10	12
p/w	8	5	5	3.33	2.4

---

capacity = 10

1	1
3	8
2	5
3	
1	

$= x_5 + x_2 + x_3 + x_1 + (x_4/5)$

$= 8 + 15 + 10 + 10 + \dfrac{12}{5}$

$= 43 + \dfrac{12}{5}$

$= 43 + 2.4$

$= \boxed{45.4}$