Escuela de Ingeniería en Computación
Investigación de Operaciones

Knapsack Problem

Dynamic Programming

Group 40
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1 Knapsack

2 Problem

Agua: Amount:30, Profit:1, and Cost:2
Barrita: Amount:2147483647, Profit:2, and Cost:13
Linterna: Amount:10, Profit:5, and Cost:5
Encendedor: Amount:2147483647, Profit:3, and Cost:3
Kit de Costura: Amount:1, Profit:4, and Cost:7
This translates to:
Maximize $Z = 1X_{\text{Agua}}+2X_{\text{Barrita}}+5X_{\text{Linterna}}+3X_{\text{Encendedor}}+4X_{\text{Kit de Costura}}$
Subject to:
$20 \geq 2X_{\text{Agua}} + 13X_{\text{Barrita}} + 5X_{\text{Linterna}} + 3X_{\text{Encendedor}} + 7X_{\text{Kit de Costura}}$
$X_{\text{Agua}} \leq 30$
$X_{\text{Barrita}} \leq 2147483647$
$X_{\text{Linterna}} \leq 10$
$X_{\text{Encendedor}} \leq 2147483647$
$X_{\text{Kit de Costura}} \leq 1$

3 Costs Table

Capacity	Agua	Barrita	Linterna	Encendedor	Kit de Costura
0	0 x=0	0 x=0	0 x=0	0 x=0	0 x=0
1	0 x=0	0 x=0	0 x=0	0 x=0	0 x=0
2	1 x=1	1 x=0	1 x=0	1 x=0	1 x=0
3	1 x=1	1 x=0	1 x=0	3 x=1	3 x=0
4	2 x=2	2 x=0	2 x=0	3 x=1	3 x=0
5	2 x=2	2 x=0	5 x=1	5 x=0	5 x=0
6	3 x=3	3 x=0	5 x=1	6 x=2	6 x=0
7	3 x=3	3 x=0	6 x=1	6 x=0,2	6 x=0
8	4 x=4	4 x=0	6 x=1	8 x=1	8 x=0
9	4 x=4	4 x=0	7 x=1	9 x=3	9 x=0
10	5 x=5	5 x=0	10 x=2	10 x=0	10 x=0
11	5 x=5	5 x=0	10 x=2	11 x=2	11 x=0
12	6 x=6	6 x=0	11 x=2	12 x=4	12 x=0
13	6 x=6	6 x=0	11 x=2	13 x=1	13 x=0
14	7 x=7	7 x=0	12 x=2	14 x=3	14 x=0
15	7 x=7	7 x=0	15 x=3	15 x=0,5	15 x=0
16	8 x=8	8 x=0	15 x=3	16 x=2	16 x=0
17	8 x=8	8 x=0	16 x=3	17 x=4	17 x=0
18	9 x=9	9 x=0	16 x=3	18 x=1,6	18 x=0
19	9 x=9	9 x=0	17 x=3	19 x=3	19 x=0
20	10 x=10	10 x=0	20 x=4	20 x=0,5	20 x=0

4 Optimal Solutions

$X_{\text{Agua}} = 0\ X_{\text{Barrita}} = 0\ X_{\text{Linterna}} = 4\ X_{\text{Encendedor}} = 0\ X_{\text{Kit de Costura}} = 0$
$X_{\text{Agua}} = 0\ X_{\text{Barrita}} = 0\ X_{\text{Linterna}} = 1\ X_{\text{Encendedor}} = 5\ X_{\text{Kit de Costura}} = 0$