Knapsack Problem

Q. Find an optimal solution for knapsack problem where n=7, m=15 $(P_1, P_2, P_3, P_4, P_5, P_6, P_7) = (10, 5, 15, 7, 6, 18, 3)$ (w1, W2, W3, W4, W5, W6, W7) = (2, 3, 5, 7, 1, 4, 1)

5017:

Number of objects (m) = 7 Capacity (m) = 15

	Object	- J.	η	3	4	5	6	7
,	Pi	- (6	5	15	7	6	18	3
	Wi	ಇ	3	5	7	ļ	4	1
	Pi/wi	5	1.67	3	١	6	4.5	3

(Method 1: Select object with maximum profit (Pi)

						,			
J.	Object	Profit (Pi)	1Wes	apt (w	C_{ℓ}	Remai	ning b	Jeight	
	- 1			-			15		
0	1.6	3/18	1	4	2	15	- 4 =	11	A CONTRACTOR OF THE PERSON OF
	3	4115	Ç.	5	Ö	11	- 5 =	= 6	
	L. (10	15	2	5	6	- · a =	= 4	ALE PROPERTY OF THE PROPERTY O
	4	4 * 1 2 4	7	4		4	-4=	- 0	
			1				X		
	Total	47		4	7.1	6			
		,	1						

Method 2: Select object with minimum weight (wi)

Object	Profit (Pi)	Inleight (wii)	Remaining Weight	
			15	
. 2	-6		15-1 = 14	
. 7	-3 (p	V STORY V	14 = 1.0 = 13	-
, ,	10	2 ع	13 3 3 = 11	1
٠ ٧	S	3	11 - 3 = 8	-
' 6	18	545	8-4=4	-
	4 * 3 = 12	(m) V 4 21	3 4- 4 = 0	-
	. 12	. V : 2 !		
Total	E 54P	7 8 7	0-1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

Method 3: Select object with maximin (Pi/wi)

	•					
	Object	Profit (Pi)	Weight (Wi)	Remaining Weight		
			<u> </u>	15		
11	2 AS T	6	÷ =-	3/15 - 1 = 14		
	2.	10	ં રૂ	7(14 - 2 = 12		
1	12 10 6 2 2 2	18	9 4	12-4=8		
	13 - 14.	15	4. 5 1 4	1 8 - 5 = 3		
	. 7	3	1	3 - 1 = 2		
	7	2 \$ 1.67 = 3.39	२	122 - 20=10		
	Total	55-34				
	Total	55-34				

Conclusion: With the help of profit approach
Profit/Weight is the best method

Q. Find the optimal solution for knapsack problem

(P1, P2, P3, P4, P5, P6, P7) = (10, 15, 12, 4, 5, 16, 8)

(W, 11/2, W2, W4, W5, W6, W2) = (2,4,5,4,2,3)

5017:

Number of objects (n) = 7 Capacity (m) = 16

6.2		the second second second second second second second	And the last terror of the last	The same of the sa					
	Objects	A	Q ?	W	4-	12.5	6	DA	
	7 2	0	-15	12	40	ે6	16-	8:	The state of the s
2	Wi	3	4	5	4	2	3	3	
	Pi/wii	5	3.75	2.4	1	3	2-33	2.66	

Method 1: Select object with maximum profit (Pi)

Object	Profit	Weight	Remaining Weight	
304	Val		16	A constant
6	16 31	3	16 2-3 = 13	
Q	15	4	13 - 4 = 9	
Ñ	- 12	5	9 34 5 = 40	E C
	a lo c	2	4 - 2 = 2	b
. 7	2 4 2.66=5.32	£ 5	2 - 2 = 0	
· (°)			3. A V. G. F. Z	
Total	58.32			

	Object	Profit	Weight	Remaining Weight
The state of the s				16
	1	10	ع	16 - 2 = 14
	5	6	1-2 1	14 - 2 = 12
Comment of the contract of the	6	16	(-3	12 - 3 = 9
	7	B	3	9 - 3 = 6
	2	15	34	6 - 4 = 2
	4	2 41=2	:2	2 2 - 2 = 0
			۵	
	Total	57	8	1 C 275 2 4

Method &: Select object with maximum ratio (Pi/mi)

Object Profit Weight Remaining Weight					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Object	Profit	Weight	Remaining Weight	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6	16	3	16 = 3 = 13	The same of the sa
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.	+ 10 51	2 4	13 = 2 = 11	C
7 8 3 5 - 3 = 2 3 2*2.4:4.8 2 2 - 2 = 0	اچ ا	0 15 p	4	11 - 4 = 7	18 All
3 2 * 2 4 2 4 2 2 2 - 2 = 0	5	2 6 p	2	7 - 2 = 5	
es.se (erative)	75	, 1 8 \$	3	5 - 3 = 2	1
	3	24204=428	2	2 - 2 = 0	
Total 59.8				es.se leraling	
	Total	59.8			W. T. C. C.

Conclusion: With the help of profit approach
Profit / Weight is the best method

Q.	Find the	e optimal	solution for	Knapsack	problem
	Capacit	4 = 18			,

11 .		No. American				- Description of the second			
	Object	8	2	3	4	5	6	7	
	beofit	9	15	ाय	4	6	16	/8	
	Weight	ع .	3	> 5	4	3	6	.3	
	Pi/wii	4,5	5	2.4	1	4	2.66	2,66	
H	gent to								

≤01°:

Method 1: Select object with maximum postit (Pi)

la I	2				
,	Object	Profit	Weight	Remaining Weight	
			1 6	18	
- 1	6	16.	Pay 61 410	18-12-6 = 12	
	γ	15	3	12 - 3 = 9	
	3	123	5.	9 - 5 = 4	
	1	9	ચ	4 - 2 = 2	
	7	€ ×5.66= 12.35	ર	2 0 + 2 = -0	
	• *	C pr	45	i-	
	Total	57.32		31	
Walter					

Method	21	Saloak	- biect	with	กายลาดาสา	weight	(m)
Memod	4.	Select	OPIECA	SALES OF THE PARTY		3	1

	Object	Profit	meight	Remaining Weight	
	_	1-		18!	
	1	9	2	18 - 2 = 16	
	2	15.	3	16 - 3 = 13	
		5.6	3	13 - 3 = 10	
	5				
	7	8	3	10 - 3 = 7	
	4	4	4	7 - 4 = 3	
	3	342-4=7.2	3	3 - 3 = 0	
		\cdot , e_i , \cdot	· · · · · · · · · · · · · · · · · · · ·	do 1000 11 1-00	
1	Total	49.2			

Method 3: Select object with maximum ratio (Pilmi)

I				
	Object	Profit	Weight	Remaining Weight
	7	ć - <u> </u>	2	180
	2 =	5 45 C	3	18 - 3 = 15
	1	9	2	12 - 2 = 13
	6	16	6	43. = 6: = 70
	7	8	3	7 - 3 = 4
	B	4 +2.4 = 9.6	4	4 - 4 = 0
	Tota)	57.6		
- 1				

Conclusion: With the help of profit approch
Profit/weight is the best method

S017:

~ | Q Object -1 3 0 6 7 4 5 12: 15 20 6 10 3 7 18 wi 2 3 7 5 1 14 1 P; / w; 2 🌣 7.5 6.66 4.5 3) 6

Method 1: Select object with maximum profit

	Object	Profit	Weight	Remaining weight
	7	- · · · · · · · · · · · · · · · · · · ·) '' ? , 4	* ************************************
	2	50	3	15 - 3 = 12
	6	18	41,5	12 -7 4 = 2 8
)	2: 15	ت ع ا	8 - 2 = 6
	. 3	100	5	62/- 5 = 1
-	4 4	f # 1 = 21	=1	1 - 1 = 0
	P	21	1	
	Total =	64	2.2	8/ 8
1		1	,	

Object	Profix	weight	Remaining Weight
	and the second s		15
5	6		15 - 1 = 14
7	3		14 - 1 = 13
1	015 3	a 2	13 + 3 = 11
२	20	3	11 - 3 = 8
6	21 12	4	8 - 4 = 4
3	4 4 2 = 8	40	4 - 4 20
Total.	76	JY. o for	40 forto - 1. 41 7

Method 3: Select object with maximum ratio (P./m)

Object	Profit	Weight	Remaining weight
., _	c - - :	2	2/ 15
1)	15	2	15 - 2 = 13
Z	1 -20	3	113 3 = 10
5	6)	10 - 1 = 9
6	18	4	90 - 14 = 5
7	3	1	5 - 1 = 4
3	442=8	4	4 - 4= 0
Total	76	The second secon	

Conclusion: Mith the help of profit approach

Pi/Wi & using minimum weight both

are the best methods