	Fractional Knapsack Problem (FKP) classmate	
	Date	
	let S be a set of 'n' items, where each item i has a positive	
lassur .	benefit bi and a posstive weight w.	
1945	the transfer that the company of the	
	Goal - find the maximum benefit Subset that does not exceed	
	total weight W.	
- لد عامق	District of the second of the	
e créalagy	In FKP, we are allowed to take arbitrary fraction X; of each item, i.e the solution is a set of values x; Such that	
	OSX; SW; for all i and	
- 230-15 <sup>0</sup>	Ex; CW	
	ZZ; SW	
	THEST TO THE TOTAL THE TOTAL TO THE TOTAL TOTAL TO THE TO	
=	the total benefit of the etems taken is determined by the	
Tails .	h. (Xi / a)	
(1)	ies bi (xi/wi)	
-	The general method for the FKP is to Compute the value index	
	for each étern i	
,	V= bi/wi	
()	The state of the s	
-	Then we Select items to include in the Knapsack, Starting	
	with the highest value index.	
	Little rate has a miles been seen a long and the	
Fra	etional KnapSaelc (S, W)	
1.	for i = 1 to ISI do	
2.		
3.	Vi = bi/wi	
4.	Insert (Vi, i) into a heap H (max value inclex at root)	
S	W←o	
6.	while w< N do 9. x = a	
7.	Remove the max value from H. 10. W = W + a	
8.	a = min { W; N-W}	

	т
Ana	dysis
	Assuming S is a heap based priority queue and then the removal
	has complexity O(logn), So to remove in elements takes
_ books	O(nlogn)
	and the post of the control of the c
-	If we use a Circular list for s, the renoval is O(1) so the
te Carl	algorithm is O(N), including the Sort we again have O(nlogy)
Exe	mple
-	Consider 5 items along their respective weights and values
I	= < I, , I2, I3, Iu, I5)
	= < 5, 10, 20, 30, 40>
24	= (30, 20, 100, 90, 160)
	Capacity of trapsack N=60, find the Solution to the FKP
Solu	tion item wi vi
	II 5 30
	I <sub>2</sub> 10 20
	I3 20 100
L. nesti	Iy 30 90
	J 40 160
	Taking value per mergut vatio i.e pi= Vi/wi
	French Program CS W. J. T. T.
	Item Wi Vi Pi=Ve/wi
	II 5 30 6.0
	I <sub>2</sub>   0 20 2.0
Character	I3 20 100 5.0
	Iy 30 90 3.0
	J 40 160 4.0
	toward to the think pulse years of more than
	The Justin Carly of 1 4

(EPRIFERENT)

	Now arrange the value of by	in delreasing order
	Item we di	pi = Vi/wi
	I, 5 30	60
TI	I3 20 100	5.0
	Ig 40 160	4.0
	Iy 80 90	3. 👩
	I <sub>2</sub> 10 20	2.0
	The second secon	
	Not Con the board of	+ At dans: 101 at 1
	Now fill the knapsack according	of to the decreasing value of p
	1 2 - 1 - 1 - 1 - 1 - 1	27
	35 7 140 -> (160 x	35
	20 60 100 40	and the second second
	5 30	
28	weight value (30+	100+140 = 270)
	465	
	To Show O/, Knapsack Cannol	- he Colored by Consider
	10 2.600   Napsacre Smith	To solve by green
	Three items \$60 \$100	\$120 Knabsack
	Three items \$60 \$100	
		- July
	item 1 item2	item3
	6\$ p 5\$/p	44/9
	With Greedy method	optimal Solution
\$ 100	20 or 30 \$120	20/30 \$ 80
\$ 60	10 10 \$60	20 \$100
1		10 \$60
0		
	\$160 \$180	= 240\$