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| **SUBJECT** | Design and Analysis of Algorithm |
| **EXPERIMENT NO :** | 05 |
| **DATE OF PERFORMANCE** | 03/04/2023 |
| **DATE OF SUBMISSION** | 11/04/2023 |
| **AIM:** | To implement fractional knapsack problem and calculate profit. |
| **PROBLEM STATEMENT 1:** | **Fractional knapsack problem** |
| **ALGORITHM and THEORY:** | Algorithm: Greedy-Fractional-Knapsack (w[1..n], p[1..n], W) for i = 1 to n  do x[i] = 0 weight = 0 for i = 1 to n  if weight + w[i] ≤ W then x[i] = 1  weight = weight + w[i] else  x[i] = (W - weight) / w[i] weight = W  break return x |

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| **PROGRAM:** | #include<stdio.h> #include<stdlib.h> struct Item  {  int SrNo;  float w,profit,ratio;  };  void sort(int n,struct Item a[n])  {  int i,j;  struct Item temp; for(i=0;i<n-1;i++)  {  for(j=0;j<n-1;j++)  {  if(a[j].ratio>a[j+1].ratio)  {  temp=a[j]; a[j]=a[j-1]; a[j-1]=temp;  }  }  }  }  void main()  {  int n,i;  float W,p=0;  printf("Enter the capacity:"); scanf("%f",&W);  printf("Enter the number of elements:"); scanf("%d",&n);  struct Item a[n]; for(i=0;i<n;i++) |

{

printf("Enter the weight and profit:"); scanf("%f %f",&a[i].w,&a[i].profit);

a[i].ratio=a[i].profit/a[i].w; a[i].SrNo=i+1;

}

printf("\nINITIAL TABLE:\nSr.NO\t\tweight\t\tProfit\t\tP/w"); for(i=0;i<n;i++)

{

printf("\n%d\t\t%f\t%f\t%f\n",a[i].SrNo,a[1].w,a[i].profit,a[i].ratio);

}

sort(n,a);

printf("\nSORTED TABLE:\nSr.NO\t\tweight\t\tProfit\t\tP/w\n"); for(i=0;i<n;i++)

{

printf("%d\t\t%f\t%f\t%f\n",a[i].SrNo,a[1].w,a[i].profit,a[i].ratio);

}

printf("\_\_\_ printf("Knapsack Table:\nSrNo\tElement\t\tweight\t\tProfit\t\tRatio\t\tRe for(i=0;i<n;i++)

{

if(W>=a[i].w)

{

W-=a[i].w; p+=a[i].profit;

}

else if(W<=a[i].w)

{

p+=W\*a[i].ratio; W=0;

}

printf("\n%d\t\t%d\t\t%f\t%f\t%f\t%f\t\t%f\n",(i+1)

,a[i].SrNo,a[i].w,a[i].profit,a[i].ratio,W,p);

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| **OUTPUT:** | if(W==0)  {  break;  }  }  printf("\nTotal Profit: %f",p);  } |

**CONCLUSION:**

By performing above experiment I have understood knapsack problem and I have been able to calculate the profit accurately.