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Problem-1:

```
Problem1_007.cpp x
1  #include <bits/stdc++.h>
2  using namespace std;
3  int arr[1000000];
4  void my_sort(int *arr, int *arr_end){
5      int n = arr_end - arr;
6      for (int gap = n / 2; gap > 0; gap /= 2)
7      {
8          for (int i = gap; i < n; i += 1)
9          {
10             int temp = arr[i];
11             int j;
12             for (j = i; j >= gap && arr[j - gap] > temp; j -= gap)
13                 arr[j] = arr[j - gap];
14             arr[j] = temp;
15         }
16     }
17 }
18
19 int main()
20 {
21     int n;
22     int i = 0;
23     while (1)
24     {
25         cin >> n;
26         if (n == 0){
27             return 0;
```

*Problem1_007.cpp x

```
27         return 0;
28
29     }
30     if (n == -1)
31     {
32         my_sort(arr, arr + i);
33         if (i % 2 == 0){
34             cout << arr[i / 2 - 1] << " ";
35             for (int j = i / 2 - 1; j < i - 1; j++)
36                 arr[j] = arr[j + 1];
37
38         }
39         else {
40             cout << arr[i / 2] << " ";
41             for (int j = i / 2; j < i - 1; j++)
42                 arr[j] = arr[j + 1];
43         }
44
45         i--;
46     }
47     else
48     {
49         arr[i] = n;
50         i++;
51     }
52     return 0;
53 }
54
```

*Problem1_007.cpp x

C:\Users\Riyadh\OneDrive\Desktop\test\Problem1_007.exe

```
9
10
2
5
1
18
-1
5
```

Problem: 2

```
Problem2_007.cpp x
1  #include <bits/stdc++.h>
2  using namespace std;
3  struct Item
4  {
5      int value, weight;
6  };
7  void fractional_Knapsack(float W, Item arr[], int n)
8  {
9
10     for (int gap = n / 2; gap > 0; gap /= 2)
11     {
12         for (int i = gap; i < n; i += 1)
13         {
14             Item temp = arr[i];
15             int j;
16             for (j = i; j >= gap && (arr[j - gap].value / arr[j - gap].weight) < (temp.value / temp.weight); j -= gap)
17                 arr[j] = arr[j - gap];
18             arr[j] = temp;
19         }
20     }
21
22     float res = 0;
23     for (int i = 0; i < n; i++)
24     {
25         if (arr[i].weight <= W)
26         {
```

```
*Problem2_007.cpp x
27             res += arr[i].value;
28             W -= arr[i].weight;
29         }
30     else
31     {
32         res += arr[i].value * (W / arr[i].weight);
33         break;
34     }
35 }
36 cout << "Maximum possible value = " << res << endl;
37 }
38
39 int main()
40 {
41     Item arr[10000] ;
42     int n;
43     cin >> n;
44     for (int i = 0; i < n; i++)
45     {
46         cin >> arr[i].value >> arr[i].weight;
47     }
48     float W ;
49     cin >> W;
50     fractional_Knapsack(W, arr, n);
51     return 0;
52 }
53
```

```
*Problem2_007.cpp x
C:\Users\Riyadh\OneDrive\Desktop\test\Problem2_007.exe
3
60 10
100 20
120 30
50
Maximum possible value = 240

Process returned 0 (0x0)   execution time : 23.524 s
Press any key to continue.
```

Problem:3

```
Problem3_007.cpp x
1  #include <bits/stdc++.h>
2  using namespace std;
3
4  struct Activity {
5      int start, finish;
6  };
7  bool activityCompare(Activity s1, Activity s2) {
8      return (s1.finish < s2.finish);
9  }
10
11 void activity_selection(Activity arr[], int n) {
12     sort(arr, arr+n, activityCompare);
13     int i = 0;
14     cout << "(" << arr[i].start << ", " << arr[i].finish << ")", ";
15
16     for (int j = 1; j < n; j++) {
17         if (arr[j].start >= arr[i].finish) {
18             cout << "(" << arr[j].start << ", " << arr[j].finish << ")", ";
19             i = j;
20         }
21     }
22 }
23
```

Problem3_007.cpp x

```
13     int i = 0;
14     cout << "(" << arr[i].start << ", " << arr[i].finish << "), ";
15
16     for (int j = 1; j < n; j++) {
17         if (arr[j].start >= arr[i].finish) {
18             cout << "(" << arr[j].start << ", " << arr[j].finish << "), ";
19             i = j;
20         }
21     }
22 }
23
24 int main() {
25     Activity arr[10000];
26     int n;
27     cin >> n;
28     for (int i = 0; i < n; i++) {
29         cin >> arr[i].start >> arr[i].finish;
30     }
31     cout << "Following activities are selected: \n";
32     activity_selection(arr, n);
33     return 0;
34 }
35
```

Problem3_007.cpp x

C:\Users\Riyadh\OneDrive\Desktop\test\Problem3_007.exe

```
5
1 2
3 4
0 6
5 7
8 9
Following activities are selected:
(1, 2), (3, 4), (5, 7), (8, 9),
Process returned 0 (0x0)   execution time : 19.197 s
Press any key to continue.
```