Code:

```
#include <algorithm>
#include <cmath>
#include <iostream>

using namespace std;

const int MAXN = 1005;

int weight[MAXN], value[MAXN];
double density[MAXN];
int taken[MAXN];

int main() {
  int n, capacity;
  cout << "Enter the number of items: ";
  cin >> n;
  cout << "\nEnter the capacity of knapsack: ";
  cin >> capacity;

  cout << "\nEnter the weight and value of each item:\n";
  for (int i = 1; i <= n; i++) {
    cin >> weight[i] >> value[i];
    density[i] = (double)value[i] / weight[i];
  }

  for (int i = 1; i <= n; i++) {
    for (int j = i + 1; j <= n; j++) {
      if (density[i] < density[j]) {
        swap(density[i], density[j]);
        swap(weight[i], weight[j]);
        swap(value[i], value[j]);
      }
    }
  }

  double total_profit = 0.0;
  int remaining_capacity = capacity;
  int i = 1;
  while (remaining_capacity > 0 && i <= n) {
    if (remaining_capacity >= weight[i]) {
      total_profit += value[i];
      remaining_capacity -= weight[i];
      taken[i] = 1;
    }
    else {
      total_profit += (double)remaining_capacity / weight[i] * value[i];
```

```
      remaining_capacity = 0;
      taken[i] = remaining_capacity / weight[i];
    }
    i++;
  }

  cout << "\nTotal profit earned: " << total_profit << endl;
  cout << "\nSolution vector: ";
  for (int i = 1; i <= n; i++) {
    cout << taken[i] << " ";
  }
  cout << endl;

  return 0;
}
```

Sample Output:

```
Enter the number of items: 5
Enter the capacity of knapsack: 100
Enter the weight and value of each item:
20 10
30 20
66 30
40 40
60 50
Total profit earned: 90

Solution vector: 1 1 0 0 0
```