CSE548 Quiz 2017-10-23 Name: _____

Q1. Fractional Knapsack using SELECT

We walk in to a store with a budget B. The store has N types of items each with m_i number of units. For each item type *i* in the store, the unit cost of the item *i* is c_i and unit value of the item *i* is v_i. Any fraction *f* of the types of items can be purchased, where $0 \leq f \leq m_i$. For fraction *f* the cost is $f \times c_i$ and the value is $f \times v_i$.

We want to select all or portion of the items of each type in the store so as to maximize the value without exceeding the budget B. Describe an efficient algorithm to determine what portion of each type of items we should buy. Analyze the time of your algorithm.

* **Hint**: Utilize the SELECT algorithm. Define a variable that represent efficacy of the unit item in terms of c_i and v_i.