## CSE3401 Summer 2012 Assignment #2, Due by June 23<sup>rd</sup> 2012 11:59PM

Bill-of-Material (BOM) is a list of components and sub-products that make a particular product.

(UOM stands for unit of measure, EA stands for each, L stands for liter, H stands for hour)

To produce a batch of banana ice cream you might need to follow this BOM:

Banana Ice Cream Batch =

1.00 EA \* ice cream base batch

0.05 EA \* banana flavour batch

1.00 EA \* basic labour batch

1.00 UOM \* packaging (UOM EA) @ 0.2kg/UOM @ \$1.00/UOM

Ice Cream Base Batch =

5.00 UOM \* milk(UOM L) @ 1.1kg/UOM @ \$2.00/UOM

0.50 UOM \* cream (UOM L) @ 1.2kg/UOM @ \$5.00/UOM

0.40 UOM \* sugar (UOM kg) @ 1.00kg/UOM @ \$4.00/UOM

Banana Flavour Batch =

10.00 UOM \* bananas (UOM kg) @ 1.00kg/UOM @ \$1.80/UOM

0.60 UOM \* chocolate (UOM L) @ 0.8kg/UOM @ \$10.00/UOM

Basic Labour Batch =

0.25 UOM mixing (UOM H) @ 0kg/UOM @ \$15.00/UOM

0.25 UOM freezing (UOM H) @ 0kg/UOM @ \$3.00/UOM

100.00 UOM storage (UOM H) @ 0kg/UOM @ \$0.10/UOM

#### **Exercise 1 (10 points)**

Define the given BOM as an F# structure in an elegant and easy to process way (for exercises 2, 3, and 4) Use tuples to represent a record with name, UOM, qty, weight/UOM, and cost/UOM. You may need custom data type (discriminating union) to do this properly.

# **Exercise 2 (20 points)**

Write a recursive function to compute the cost of 1 batch of product given is such a data structure. Then using this function compute the cost of 1 batch of banana ice cream.

Write a function that used mapping functions (map and reduce) to compute the cost of 1 batch of product given is such a data structure. Then using this function compute the cost of 1 batch of banana ice cream.

## **Exercise 3 (10 points)**

Write a recursive function to compute the weight of 1 batch of product given is such a data structure. Then using this function compute the weight of 1 batch of banana ice cream.

Write a function that used mapping functions (map and reduce) to compute the weight of 1 batch of product given is such a data structure. Then using this function compute the weight of 1 batch of banana ice cream.

Compute the cost per 1 kg of banana ice cream.

## Exercise 4 (10 points)

Rewrite the function (that uses mapping functions) from exercise 2 or 3 to take any function that can be applied for map and for reduce.

Compute the cost of 1 batch of banana ice cream using this generic function and supply the costing subfunctions as lambda expressions.