**CS234  
Lab #1  
Thomas Crow  
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**1 (R1.13). (20 points) Write an algorithm (pseudocode) to settle the following question: A bank account starts out with $10,000. Interest is compounded monthly at 6 percent per year (0.5 percent per month). Every month, $500 is withdrawn to meet college expenses. After how many years is the account depleted?**

BEGIN  
DECLARE Balance  
DECLARE NumberofMonths  
DECLARE NumberofYears   
DECLARE MonthlyInterest  
DECLARE MonthlyWithdrawl  
SET Balance to 10,000  
SET MonthlyInterest to 0.005  
SET MonthlyWithdrawl to 500  
WHILE Balance is greater than 0  
 INCREMENT NumberofMonths by 1  
 COMPUTE Balance as Balance plus the product of Balance multiplied by MonthlyInterest  
 COMPUTE Balance as Balance minus MonthlyWithdrawl  
END WHILE  
COMPUTE NumberofYears as the quotient of NumberofMonths divided by 12  
COMPUTE NumberofMonths as the remainder of NumberofMonths divided by 12  
DISPLAY the value of NumberofYears and NumberofMonths   
END

**2 (P1.1). (20 points) You want to decide whether you should drive your car to work or take the train. You know the one-way distance from your home to your place of work, and the fuel efficiency of your car (in miles per gallon). You also know the one-way price of a train ticket. You assume the cost of gas at $4 per gallon, and car maintenance at 5 cents per mile. Write an algorithm pseudocode) to decide which commute is cheaper.**   
   
BEGIN  
DECLARE OneWayDistance  
DECLARE FuelEfficiency  
DECLARE PriceofTrainTicket  
DECLARE PriceofGas   
DECLARE CarMaintenancePerMile   
DECLARE PriceofDriving   
DECLARE GallonsofGasUsed   
GET OneWayDistance  
GET FuelEfficiency  
GET PriceofTrainTicket  
SET PriceofGas to 4.0  
SET CarMaintenancePerMile to 0.05  
CALCULATE GallonsofGasUsed to the value of OneWayDistance divided by FuelEfficiency  
CALCULATE PriceofDriving to the product of GallonsofGasUsed times PriceofGas plus the product of OneWayDistance times CarMaintenancePerMile  
DISPLAY The cost of driving is PriceofDriving  
DISPLAY The cost of taking the train is PriceofTrainTicket  
IF PriceofDriving is less than PriceofTrainTicket  
 DISPLAY Driving is cheaper than taking the train  
ELSE  
 DISPLAY Taking the train is cheaper than driving  
END IF  
END

**3. (30 points, 15 each) Create the following.   
a) Write a algorithm (pseudocode) to convert gallons to liters. One gallon equals 3.7854 liters. The program needs to ask the user the amount of gallons and print out the corresponding amount of liters.**BEGIN  
DECLARE NumberofGallons  
DECLARE NumberofLiters  
DECLARE GallonsToLiters  
GET NumberofGallons  
SET GallonsToLiters to 3.7854  
CALCULATE NumberofLiters to the product of NumberofGallons times GallonsToLiters   
DISPLAY The number of liters is NumberofLiters  
END **b) Create the Flowchart for your program**

Declare NumberofGallons, NumberofLiters, GallonsToLiters

Begin

Get NumberofGallons

GallonsToLiters = 3.7854

NumberofLiters = NumberofGallons \* GallonstoLiters

Display GallonstoLiters

End

**4 (30 points, 15 each) Create the following.   
   
a) Write a algorithm (pseudocode) for a program to ask the user to input an item, its individual price, and the amount. For example, Milk 2.5 3. You need to do this for 5 items.   
Then calculate: the total cost and the item with the highest price. The program needs to print the total cost, the item with the highest price and its price.**   
BEGIN  
DECLARE ItemName  
DECLARE ItemPrice  
DECLARE ItemQuantity  
DECLARE HighestPriceItem  
DECLARE HighestPrice  
DECLARE TotalCost  
FOR loop five times  
 GET ItemName  
 GET ItemPrice  
 GET ItemQuantity  
 SET TotalCost to the value of TotalCost plus the product of ItemPrice times ItemQuantity   
 IF ItemPrice is greater than HighestPrice  
 SET HighestPriceItem to the value ItemName  
 SET HighestPrice to the value ItemPrice  
 END IF  
END FOR  
DISPLAY The total cost was TotalCost  
DISPLAY The highest priced item was HighestPriceItem for HighestPrice  
END

**b) Create the Flowchart for your program**

Yes

Yes

No

No

Begin

DECLARE ItemName, ItemPrice, ItemQuantity, HighestPriceItem, HighestPrice, TotalCost

Has loop run five times?

Get ItemName, ItemPrice, ItemQuantity

TotalCost = TotalCost + (ItemPrice \* ItemQuantity)

ItemPrice > HighestPrice

HighestPriceItem = ItemName

HighestPrice = ItemPrice

Display TotalCost

Display HighestPriceItem, HighestPrice

End