

**CS234**

**Lab #1**

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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 Every month, \$500 is withdrawn to meet college expenses.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.

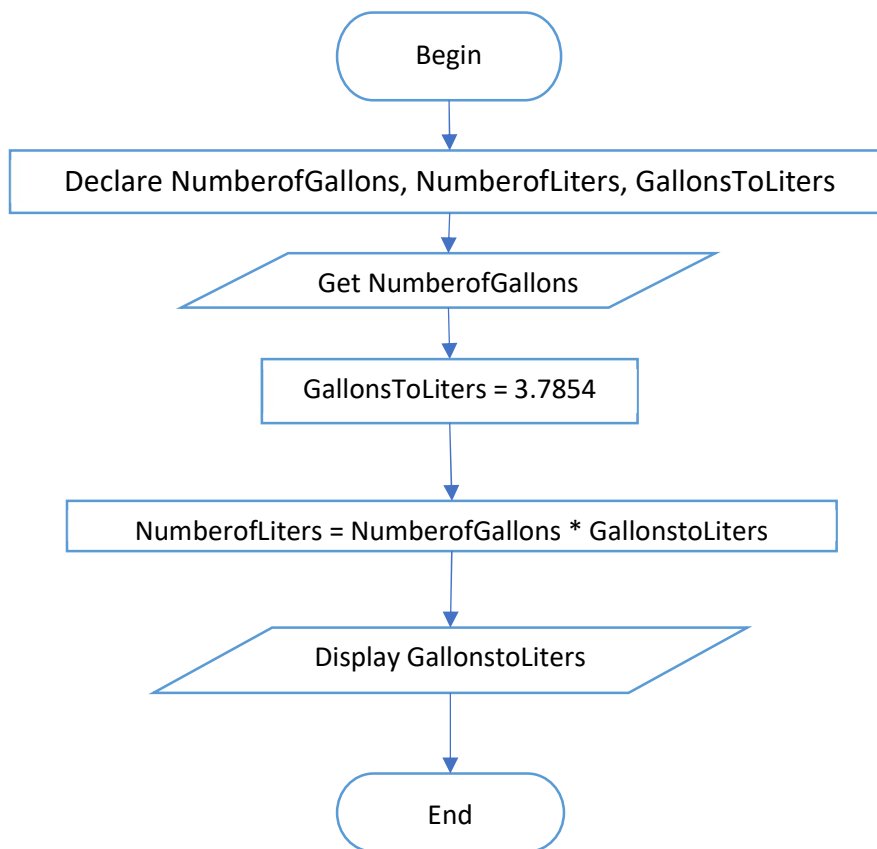
```
BEGIN
DECLARE OneWayDistance
DECLARE FuelEfficiency
DECLARE PriceofTrainTicket
DECLARE PriceofGas
DECLARE CarMaintenancePerMile
DECLARE PriceofDriving
DECLARE GallonsofGasUsed
GET OneWayDistance
GET FuelEfficiency
GET PriceofTrainTicket
SET PriceofGas to 4.0
SET CarMaintenancePerMile to 0.05
CALCULATE 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



**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**

