**Problem Solving Steps**
Planning for solving a problem; not writing the program.

**STEPS**
1. State the required output items
2. State the necessary input items
3. State the formulas necessary
4. List the steps, in order

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

**EXAMPLE #1**
Joe’s Pawn Shop pays all employees hourly, with no overtime. The federal social security tax on all salary is 6.2%. Ask the employee for the number of hours worked and the hourly pay. Calculate and print the gross pay, the amount of social security being deducted, and the net pay being received.

**SOLUTION**
1. Output: GrossPay, SSAmt, NetPay
2. Input: Hours, HourlyPay
   (NOTE: 6.2% is NOT input because it is constant for everyone!!)
3. Formulas: GrossPay = Hours * HourlyPay
   SSAmt = GrossPay * .062
   NetPay = GrossPay - SSAmt
4. List the steps in order
   Input: Hours, Hourly Pay
   GrossPay = Hours * HourlyPay
   SSAmt = GrossPay * .062
   NetPay = GrossPay - SSAmt
   Print GrossPay, SSAmt, NetPay

**SPECIFIC PROBLEM INSTANCE FOR EXECUTION**
Joe’s employee Max Brown worked 28 hours this week. He makes $10.12 per hour. Use the “Steps in Order” above to calculate his pay amounts.

**SOLUTION**
Input Hours: 28
Input Hourly Pay: 10.12
GrossPay = 28 * 10.12 = 285.88
SSAmt = 285.88 * .062 = 17.72
NetPay = 285.88 - 17.72 = 268.16
Print: 285.88, 17.76, 268.16

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
EXAMPLE #2
Mary has a new car and wants to estimate the cost for gasoline over the next 6 months. Because of her job, about 65% of her driving is on the highway and 35% in the city. Design a program that will allow her to estimate her cost for gasoline if she enters the number of miles driven, cost per gallon of gas, and the mpg for city & hwy driving.

SOLUTION
1. Output: GasCost
2. Input: CityMPG, HwyMPG, GalCost, Miles
3. Formula: 
   \[ \text{HwyMiles} = \text{Miles} \times 0.65 \]
   \[ \text{CityMiles} = \text{Miles} - \text{HwyMiles} \]
   \[ \text{CityGal} = \text{CityMiles} / \text{CityMPG} \]
   \[ \text{HwyGal} = \text{HwyMiles} / \text{HwyMPG} \]
   ** GasCost = (CityGal + HwyGal) * GalCost
4. List the steps in order
   - Input: CityMPG, HwyMPG, GalCost, PctHwy, Miles
   - HwyMiles = Miles * 0.65
   - CityMiles = Miles - HwyMiles
   - CityGal = CityMiles / CityMPG
   - HwyGal = HwyMiles / HwyMPG
   ** GasCost = (CityGal + HwyGal) * GalCost
   Print GasCost

SPECIFIC PROBLEM INSTANCE FOR EXECUTION
Mary’s new car consistently gets 24 miles per gallon in the city and 35 mpg on the highway. She drives approximately 500 miles per week. Because of her job, 65% of her driving is on the highway. She wants to estimate her cost for the next 6 months at the new gasoline price of $2.99 per gallon.

SOLUTION
Input: CityMPG = 24, HwyMPG = 35, GalCost = 2.99, Miles = 500
HwyMiles = 500 * 0.65 = 325
CityMiles = 500 - 325 = 175
CityGal = 175 / 24 = 7.29
HwyGal = 325 / 35 = 9.29
** GasCost = (7.29 + 9.29) * 2.99 = 49.57
Print 49.57