**Problem Solving**

* Problem Solving consists in using methods in orderly manner for finding solution to specific problems.
* Problem Solving techniques are used in Artificial Intelligence, Computer Science, Engineering, Mathematics, Medicine etc.
* We can also define Problem solving as, a Procedure or a Sequence of Steps that lead us to the solution of any specific or general problem.

**There are four Phases in the Process of Problem Solving:**

* Understanding the Problem
* Making Plan of Solution
* Carrying out the Plan
* Looking back i.e. verifying

**Problem List**

A) Write a program that displays two numbers.

B) Write a program that Displays sum of two numbers.

C) Write a program that inputs two numbers and adds them.

D) Write a program that inputs the number of hours from user and converts them in minutes.

Note : Variable name should be meaningful for example: hours, minutes etc.

E) Write a program that inputs the number of weeks from user and converts it into days.

F) Write a program that converts yards into meters.

G) Write a program that inputs two numbers and displays their:  
 (a) Sum (b) Difference  
 (c) Product (d) Division

H) Write a program that takes temperature in Fahrenheit and converts it into Celsius.   
((°F  -  32)  x  5/9 = °C )

I) Write a program that takes temperature in Celsius and converts it into Fahrenheit.   
(°C  x  9/5 + 32 = °F)

J) Write a program that initializes three variables and displays z after computing it as (z=x+y)

K) Write a program that Evaluates the following expression : y=3b   
(Try to Analyze which variable should be input.)

Note that 3b equals 3\*b, So don’t miss understand.

L) Write a program that Evaluate following expression: a=3+x+y\*3

M) Write a program that Inputs a number and displays its square. (Hint : y = x\*x)

N) Write a program that Evaluates the following expression : z=3x+y

O) Write a program that Evaluates the following expression : z=(x+y)/7

P) Write a program that Evaluates the following expression : (3x+y)/(z+2)

(Hint : Try to solve it without involving any additional variable)

Q) Write a program that Evaluates the following expression : (3x+z)/(y+(4\*3))

R) Write a program that Calculates and displays the Area of Rectangle. (How many variables should we need to calculate Area?)

S) Write a program that Calculates and displays the Area and Perimeter of Circle with Proper Output Message.

T) Write a program that Inputs two variables, stores their sum in the first one and the difference in the second one. And dry run your program to see if it works correctly. Also Draw an Execution Sheet on your Notebook to check whether your program works Correctly or not.

U) Write a program that inputs two numbers and interchanges their values. Also Draw an Execution Sheet and dry run your program to see if it works correctly.

V) Write a program that inputs two numbers and interchanges their values without using third variable. And dry run your program in Execution Sheet, to see if it works correctly.

W) Write a program that Inputs two variables, stores their sum in the first one and the difference in second one without using extra variable. And dry run their program in Execution Sheet, to see if it works correctly.

**Conclusion**

* Dividing our Problems into Steps/Parts makes it easy to solve as compared to solving the Problem as a whole.
* Divide our Problem into inappropriate (too much/less) steps adds to the Problem.
* Make reasonable Steps/Parts of our Problem.

**Assignment 1 (Handwritten; start of 4th Lecture)**

**From Textbook:**

* Read Timeline of Computer History at the end of Chapter 1. Summarize it decade wise.
* Write ten favorite inventions with reason.
* Write top 3 influencing inventions.

**From Problem Solving:**

Write solution and Execution Sheet of   
Question M to W given above.

**Note:**

**Your attendance will NOT be marked in the next lecture if you do not have the book.**

Lab on Wednesday (starting from 24-oct-2012):

Morning Section Lab at 1:30 PM  
Afternoon Section Lab at 9:30 AM

**For writing Program:**

There may be any word like Print, Show, Output, etc. The addition of phrase “on the screen” is also valid. One may also write “Let a=0 and b=0” instead of “Let a and b be the variables”.

In several programs, “display” is not required explicitly, but it may be assumed just to illustrate that the purpose (of conversion or calculation or whatever) has been achieved.

Sample Execution Sheet (Program T as per slides)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| PS# | Instruction | a | b | sum | diff | Output |
| 1 | Let a=0, b=0, sum=0, diff=0 | 0 | 0 | 0 | 0 |  |
| 2 | input a from user | 50 |  |  |  |  |
| 3 | input b from user |  | 35 |  |  |  |
| 4 | sum = a + b |  |  | 85 |  |  |
| 5 | diff = a – b |  |  |  | 15 |  |
| 6 | a = sum | 85 |  |  |  |  |
| 7 | b = diff |  | 15 |  |  |  |
| 8 | display a |  |  |  |  | 85 |
| 9 | display b |  |  |  |  | 15 |