SWE1301: Introduction to Problem Solving and Software Development

Lecture 06 : Solution Planning
At: CIT Theatre
12–1pm
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Lecture Outline

▸ Solution Organization Tools
  - Problem analysis chart
  - Pseudocode
  - Algorithm
  - Flow chart
  - UML diagrams

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Introduction

▸ The efficiency of the computer relies on the effectiveness of the programmer.
  ◦ The computer must be told what to do.

▸ The solution will be most effective if the programmer follows certain steps and rules that have been developed over the years.

▸ There are certain tools that aid programmers in following those steps and rules.

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Solution Organization Tools

▸ Certain tools will help you learn to give instructions and solve problems on the computer.

▸ They include:
  a. Problem Analysis Chart (PAC)   b. pseudocode
  c. Algorithms   d. flowcharts
  e. structure chart or interactivity chart   f. Coupling Diagrams
  g. UML diagrams

▸ This course will cover the first a–d.
  ◦ The remaining e–g will be covered in SWE2301 & SWE2302

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Problem Analysis Chart (PAC)

▸ The problem analysis chart is an aid to clear thinking because it helps the problem solver to identify the essential data and information in a problem and to disregard the nonessentials.

▸ A problem is analyzed using the PAC by separating it into four parts:
  ◦ The given data
  ◦ The required results
  ◦ The processing required
  ◦ The alternatives

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Problem Analysis Chart..

Given Data	Required Results
Section 1: Data given in the problem or provided by the user. These can be known values or general names for data, such as price, quantity, and so forth.	Section 2: Requirements for the output reports. This includes the information needed and the format required.
Processing Required	**Solution Alternatives**
Section 3: List of processing required. This includes equations or other types of processing, such as sorting, searching, and so forth.	Section 4: List of ideas for the solution of the problem.

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Example 1: Problem Analysis Chart..

- Calculate the Area of a circle given the radius (r)
  - ◦ The Area is calculated by multiplying the Π with radius.

Given Data	Required Results
r Π	Area
Processing Required	**Solution alternative**
Area $= \Pi r^2$	1. Define r^2 as $r*r$ or pow(r,2) 2. Define r as a constant (assign value to r) or input value.

Programming languages us PI instead of Π symbol

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Example 2: Problem Analysis Chart..

- Calculate the gross pay of an employee given the hours worked and the rate of pay.
  - ◦ The gross pay is calculated by multiplying the hours worked by the rate of pay.

Given Data	Required Results
Hours Pay Rate	Gross Pay
Processing Required	Solution Alternatives
GrossPay = Hours * PayRate	1. Define the hours worked and pay rate as constants. *2. Define the hours worked and pay rate as input values.

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Lecture Summary

- The efficiency of the computer relies on the effectiveness of the programmer or the user.

- The programmer must write solutions that are clear, organized, and correct.

- Certain organizational tools such as PAC, will help programmers to learn how to solve problems on the computer.

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Questions !!!

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