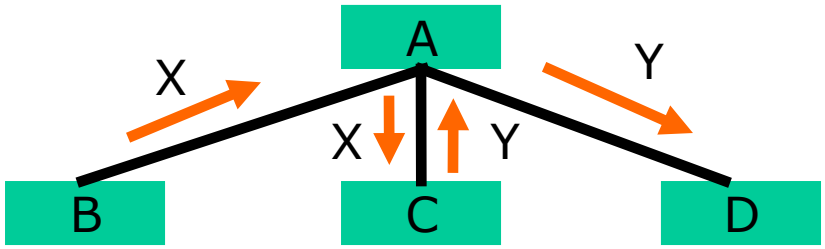
Lecture 06

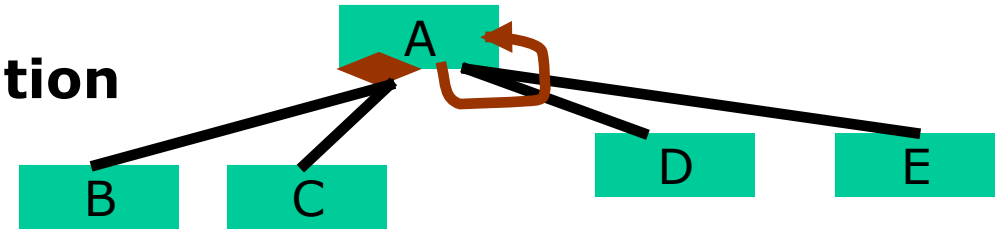
System Design

Structure Charts

- A{
  B;
  C;
  D;
  }



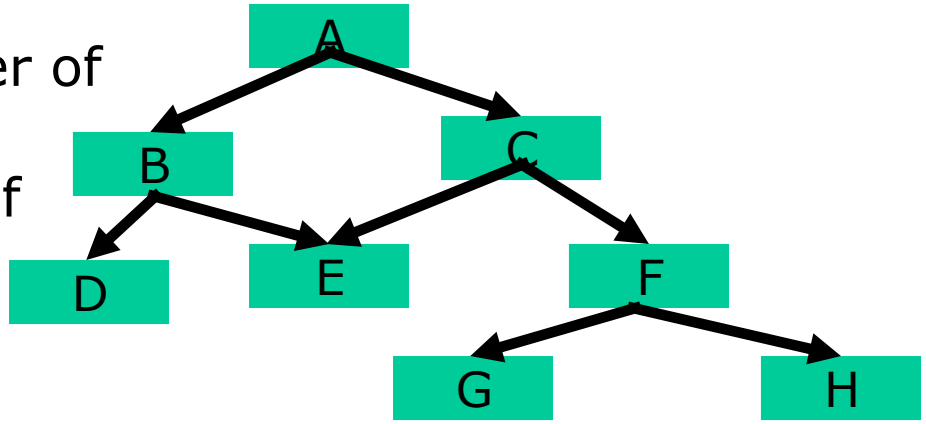
- Program modules are represented by rectangular boxes
- Conventions : to describe the system operation, it specify the **execution sequence** and **parameter passing**
- **Decision & Iteration**



Structure Charts (Cont.)

- Some criteria are used for evaluation :

1. Span of Control : Number of immediate subroutines of a module



EX. C,D,E,F,G,H are the immediate subroutines of B.

Span of Control of module B is 6

- Ideally span of control Not > 7

Structure Charts (Cont.)

2. Fan_in : Total number of modules that call a particular module.

   Ex. Fan_in of B is 1 and E is 2

   - Ideally structure chart should have high fan_in

3. Fan_out : Total number of modules which are called by a particular module

   Ex. Fan_out of B is 2

4. Scope of Control : All the module which are call the children of a particular module

5. Scope of Effect : A decision consist of all the modules whose processing is conditional on the outcome of decision

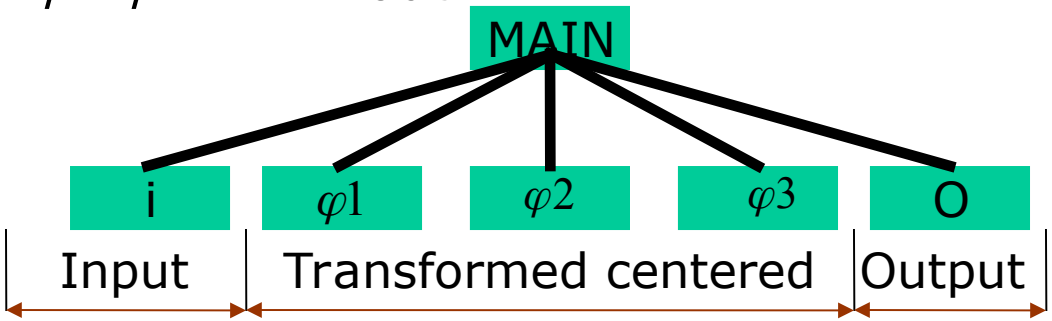
   Ex. Any change of B is effect of C, D & E

Structure Charts (Cont.)

- Two types of Structure charts
  1. Transform centered Structure charts
  2. Transaction centered Structure charts

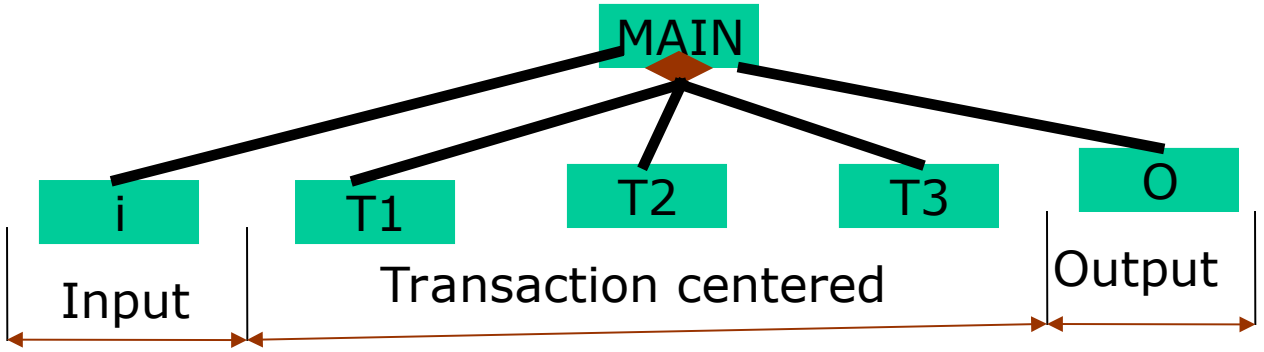
- Transform centered Structure charts :
  - Received an input
  - Transformed by a sequence of operation
  - Gives outputs

Ex. If the function is $(\varphi 3(\varphi 2(\varphi 1(I))))$ =out



Structure Charts (Cont.)

- Problem Out =A3(B3(A2(B2(A1(B1(I))))))
- Output = {T1(I), T2(I), T3(I)}



- Problem Output =G2{T1(g1(I)), T2(g1(I)), T3(g1(I))}

Problems

- Calculate the payback period from the table and state whether the project is worthwhile or not, when the rate of interest in an investment account is 8 percent.

Year	System Cost($)	System Benefits ($)
0	1,50,000	
1		70,000
2		50,000
3		80,000
4		30,000
5		20,000

Problems

1. Using COCOMO I
   - Determine the Effort to develop of a Software product
   - Determine the Duration to develop of a Software product
   - Determine the Number of People engaged to develop of a Software product.

- Input of your program is Lines of Code and Effort Adjustment Factor.

- Also determine the type of project (i) Organic, (ii) Semi-detached and (iii) Embedded.

Problems

- Using COCOMO II
  - Determine the Object Point to develop of a Software product
  - Determine the New Object Point to develop of a Software product
  - Determine the Effort to develop of a Software product
  - Determine the Number of People engaged to develop Software product, if Duration of development of the software is 5 years.

- If the software consist of 10 Screens, 4 Reports and 15 3GL Components. Assume component based development and 60% reuse is applied.