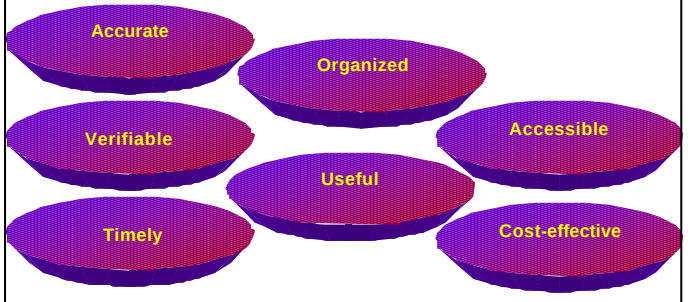
Information Management and System Development

Part I: Information System and MIS

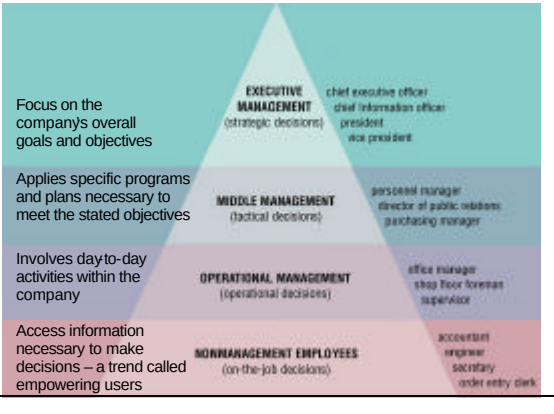
What are the qualities of valuable information?



How do managers use information?

1. objectives; strategies; tactics
2. money; people; management; structure
3. communication; instructions; motivation
4. performance; measurement; corrective action

What are the levels of users?



Information System (IS)

- Set of hardware, software, data, people, and procedures that work together to produce information

Detailed report

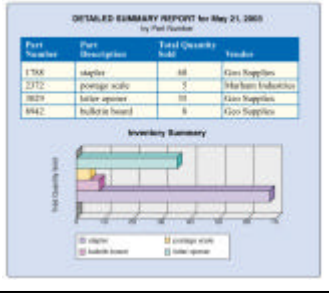
- Lists one record per line

DETAILED ORDER REPORT for May 21, 2003

Part Number	Part Description	Customer	Quantity Purchased
1788	stapler	Starlight Foods	15
		Wilson Automotive	40
		Victor Lighting	13
2372	postage scale	Regal Camera	1
		Wilson Automotive	4
3029	letter opener	AAA Rentals	25
		Starlight Foods	10
8942	bulletin board	Wilson Automotive	8

Summary report

- Consolidates data, so you can review it quickly and easily
- Usually has totals, tables, or graphs



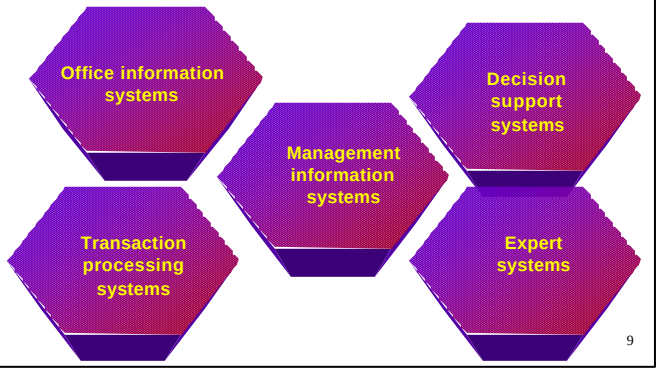
Exception report

- Identifies data outside of normal condition
- Conditions, called exception criteria, define normal activity or status range

INVENTORY EXCEPTION REPORT for May 21, 2003

Part Number	Part Description	Total Quantity on Hand	Reorder Point
8942	bulletin board	228	240
3029	letter opener	558	560

Five categories of information systems

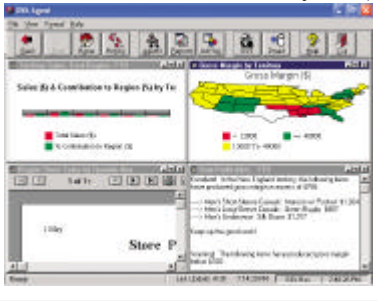


Management Information System (MIS)

- Generates accurate, timely, and organized information
- Managers and other users can
  - Make decisions
  - Solve problems
  - Supervise activities
  - Track progress
- Often integrated with transaction processing systems

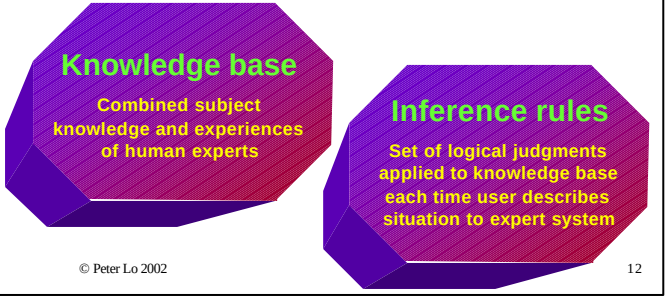
Decision Support System (DSS)

- Helps managers analyze data and make decisions
- One type of DSS is executive information system (EIS)



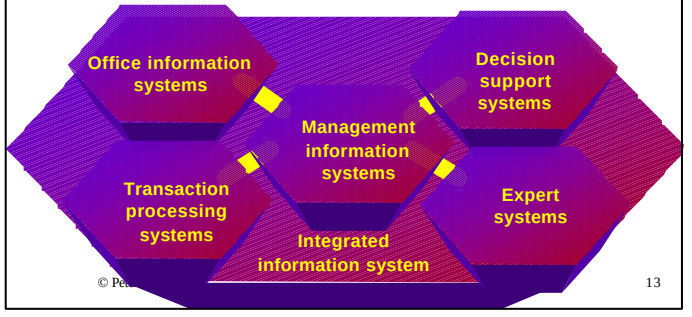
Expert System

- Captures and stores knowledge of human experts



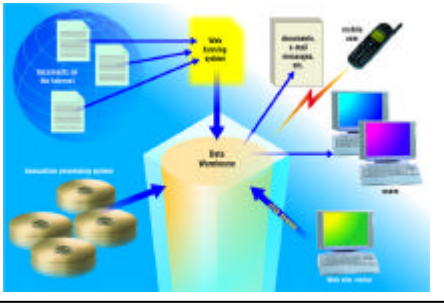
Integrated Information System

- Five information systems combined in some way



Data warehouse

- Huge database system that stores and manages data required to analyze historical and current transactions



What are terms associated with a data warehouse?

Web farming
Process of collecting data from Internet as source for data warehouse

Distributed database
Data exists in many separate locations throughout network or Internet

Data mart
Smaller version of data warehouse

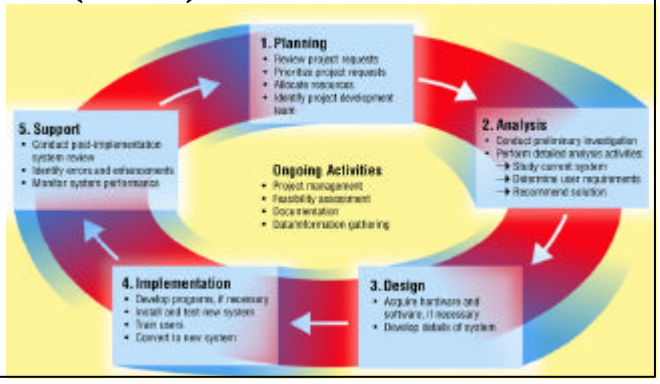
Click stream
Collection of every action that users make as they move through Web site

Data mining
Process of finding patterns and relationships among data

Information Management and System Development

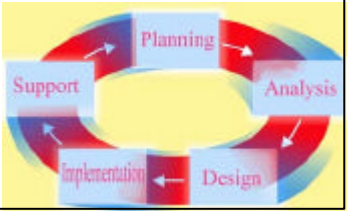
Part II: System Analysis and Design

System Development Life Cycle (SDLC)



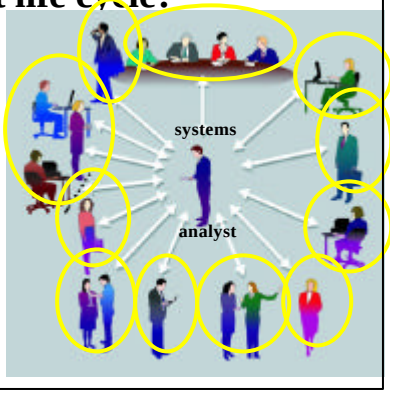
Guidelines for system development

- Divide activities or tasks into phases
- Involve users
- Develop standards
- Sets of rules and procedures company expects employees to accept and follow



Who participates in the system development life cycle?

- steering committee
- programmers
- vendors
- Webmaster
- network engineer
- other system analysts
- management
- database specialist
- data warehouse specialist
- users
- data comm specialist



Systems Analyst

- Responsible for designing and developing information system
- Liaison between users and IT professionals
- Converts user requests into technical specifications

Project Team

- Formed to work on project from beginning to end
- Consists of users, systems analyst, and other IT professionals

Project leader

Manages and controls project budget and schedule

Project Management

- Process of planning, scheduling, and then controlling activities during SDLC

responsibilities of project manager

- Establish goal, objectives, and expectations of the project, called the scope
- List required activities
- Determine time for each activity
- Give cost estimates for each activity
- Order activities
- List activities that can take place at the same time

Gantt chart

- Popular tool used to plan and schedule time relationships among project activities

ID	Task Name	Duration	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
1	Planning	2w	1/26	2/6						
2	Analysis	12w	2/9				5/1			
3	Design	12w			3/23			6/12		
4	Implementation	3w						6/15		8/7

Feasibility

- Measure of how suitable system development will be to company

four feasibility tests

- Operational feasibility
- Schedule feasibility
- Technical feasibility
- Economic feasibility
  - also called cost/benefit feasibility

Phase 1: Identifying the problems and opportunities

- Begins when steering committee receives project request
- Function of committee:
  - Review and approve project
  - Prioritize requests
  - Allocate resources
  - Form project development team

Phase 2: Analyzing and documenting the existing information system

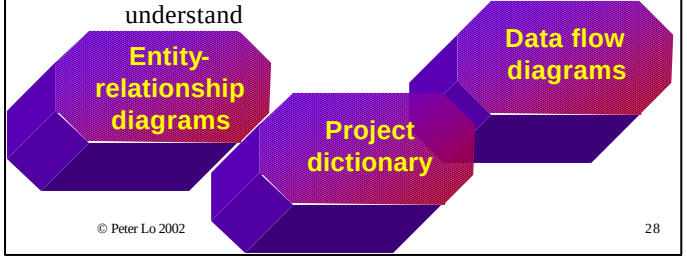
- Consists of two major tasks

Phase 3: Designing the system

- Acquire hardware and software
- Develop all details of new or modified information system

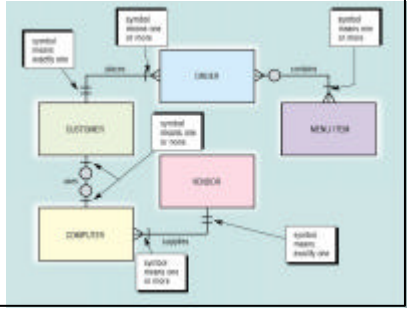
Structured analysis and design

- Technique that attempts to address problem by using graphics and other tools
- Used to document findings in way everyone can understand



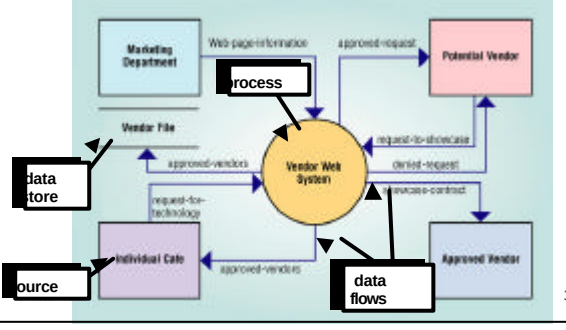
Entity-Relationship Diagram (ERD)

- Tool that graphically shows connections between entities in system



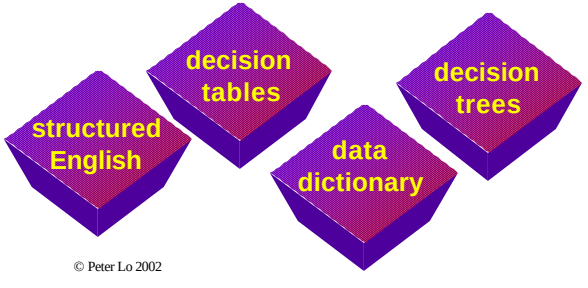
Data Flow Diagram (DFD)

- Tool that graphically shows flow of data in system



Project Dictionary

- Documentation and deliverables of project
- Helps keep track of huge amount of details in system



Structured English

- Used to explain details of process in project dictionary

UPLOADING VENDOR INFORMATION

For each item containing vendor information, perform the following steps:

If the item is not a computer file then

Use the scanner to convert it into a file format.

Copy the file into the Vendor Information folder on your hard disk.

Zip all new files in the Vendor Information folder into a single file.

Save the zipped file in a Web folder.

E-mail the Webmaster with the name of the zipped file.

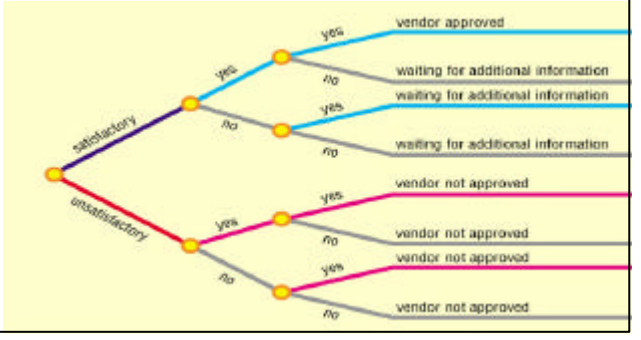
Decision Table

- Lists variety of conditions and actions that correspond to each condition

		1	2	3	4	5	6	7	8
CONDITIONS	Background check results (S = Satisfactory, U = Unsatisfactory)	S	S	S	S	U	U	U	U
	References furnished?	Y	Y	N	N	Y	Y	N	N
	Passed credit check?	Y	N	Y	N	Y	N	Y	N
ACTIONS	Vendor approved	X							
	Vendor not approved					X	X	X	X
	Waiting for additional information		X	X	X				

Decision Tree

- Diagram that shows conditions and actions graphically

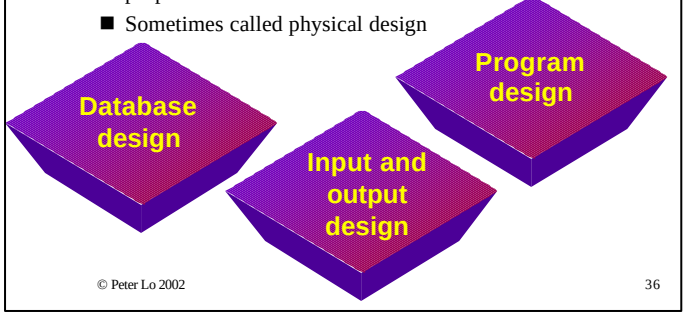


Data Dictionary

- Stores name, description, and other details about each data item

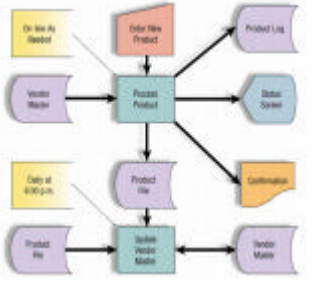
Detailed Design

- Develop detailed design specifications for components in proposed solution
- Sometimes called physical design



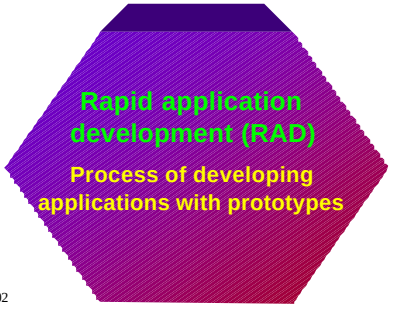
System Flowchart

- Documents relationships among programs in process
- Shows how other elements of system interact with major process



Prototype

- Working model of proposed system



Computer-aided Software Engineering (CASE)

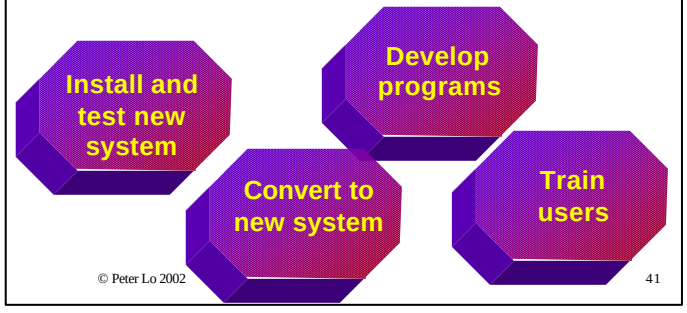
- Software tools designed to support one or more SDLC activities

Structured walkthrough

- Step-by-step review by project team and users of any SDLC deliverable
- Used to review detailed design specifications before they are given to programming team

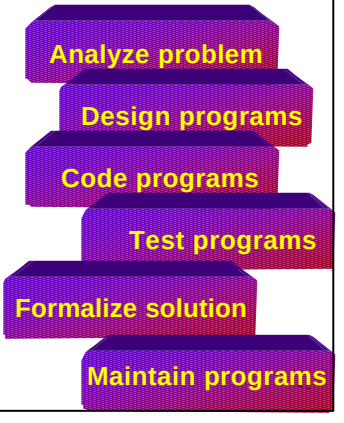
Phase 4: Implementing the System

- To construct, or build, new or modified system and then deliver it to users

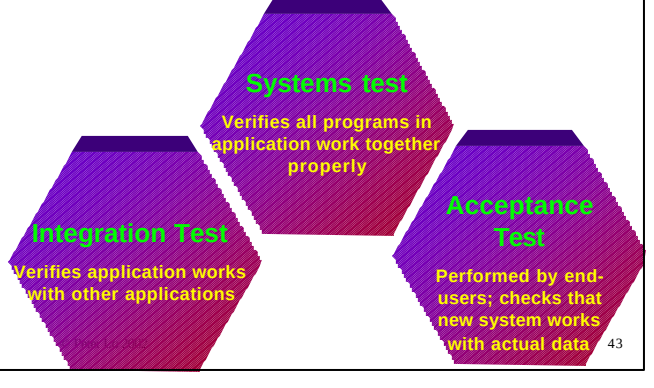


Program Development Life Cycle (PDLC)

- Programmers write programs as per specifications
- They follow an organized set of activities known as PDLC



What are the three types of tests performed by system developers?

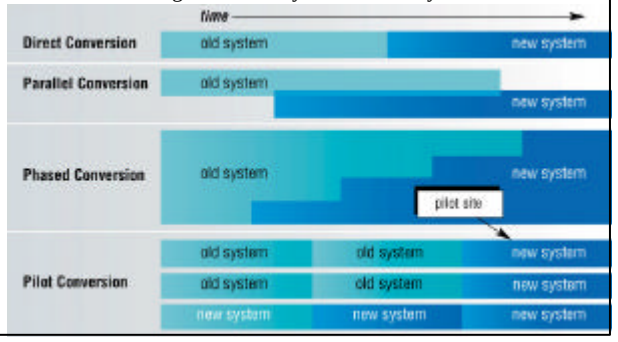


Training

- Showing users exactly how they will use new hardware and software in system

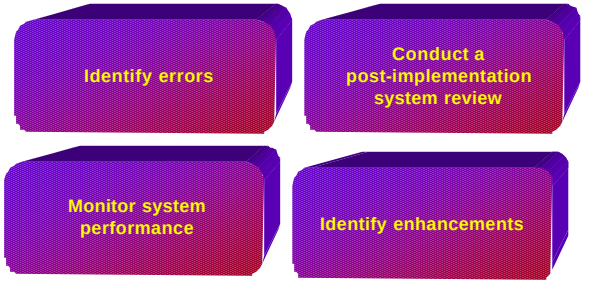
Conversion strategies

- Used to change from old system to new system



Phase 5: Support the System

- Provides ongoing assistance after system is implemented



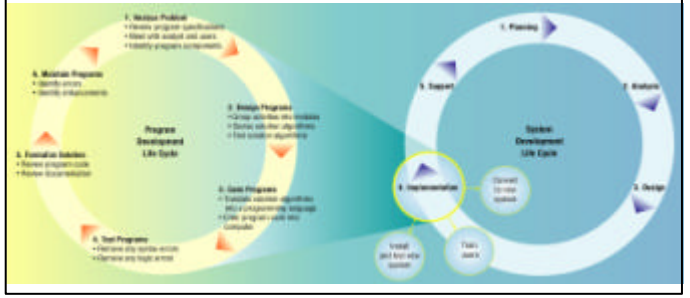
Information Management and System Development

Part III: Program Development

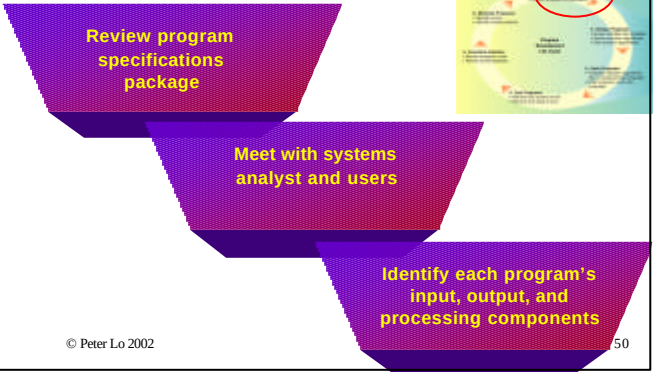
Program Development Life Cycle

How is program development related to system development?

- Program development is ongoing process within system development



Phase 1: Defining the problem



IPO chart

- Identifies program's inputs, outputs, and processing steps
- Used to establish design specifications

INPUT	PROCESSING	OUTPUT
Regular Time Hours Worked	Read regular time hours worked, overtime hours worked, hourly pay rate.	Gross Pay
Overtime Hours Worked	Calculate regular time pay.	
Hourly Pay Rate	If employee worked overtime, calculate overtime pay.	
	Calculate gross pay.	
	Print gross pay.	

Phase 2: Designing the program

top-down design

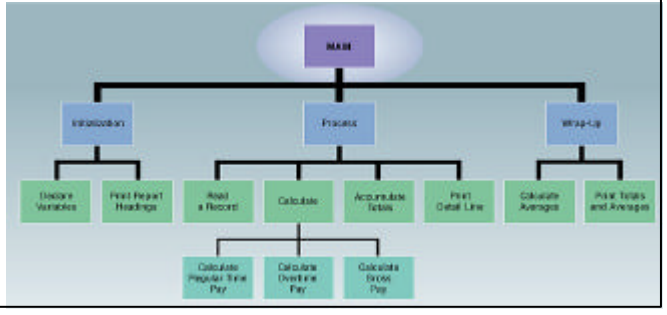
Focuses on **what** program should do

structured design

Focuses on **how** to build program based on requirements

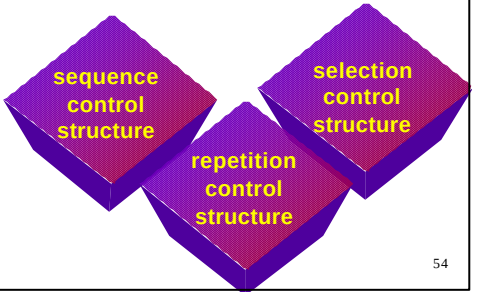
Hierarchy Chart

- Used to show program modules graphically
- Also called structure chart or top-down chart



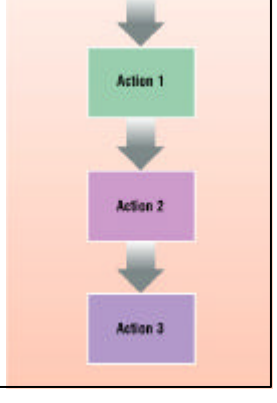
Structured Design

- Technique that builds all program logic from combination of three basic control structures



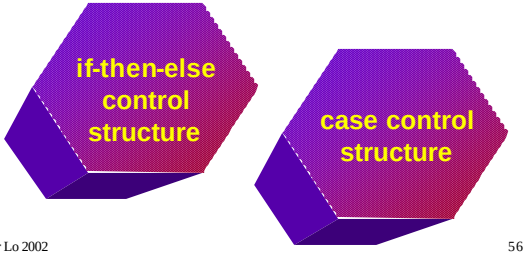
Sequence Control Structure

- Shows one or more actions following each other in order
- Actions could be
  - Inputs
  - Processes
  - Outputs

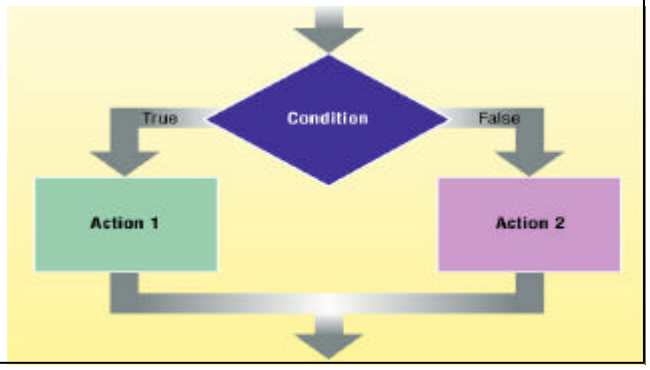


Selection Control Structure

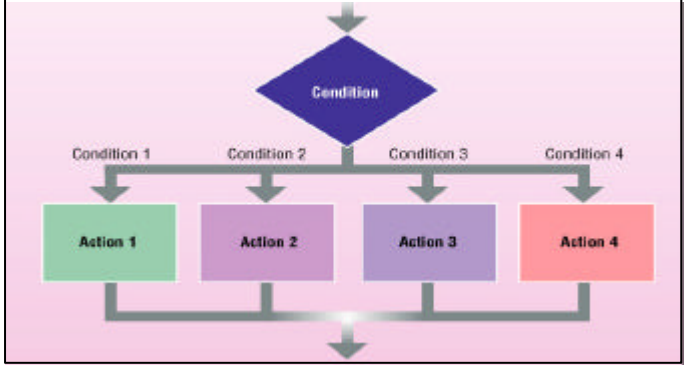
- Tells program which action to take, based on a certain condition



If-then-else Control Structure



Case Control Structure

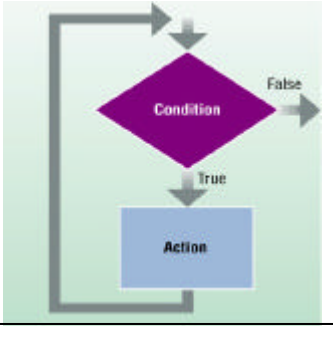


Repetition Control Structure

- Used when program performs one or more actions repeatedly as long as certain condition is met

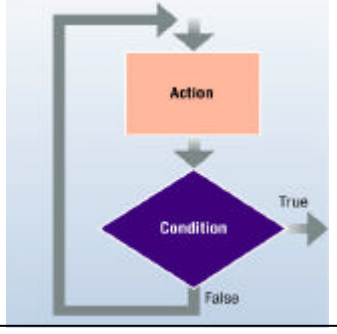
Do-while Control Structure

- Repeats one or more times as long as condition is true



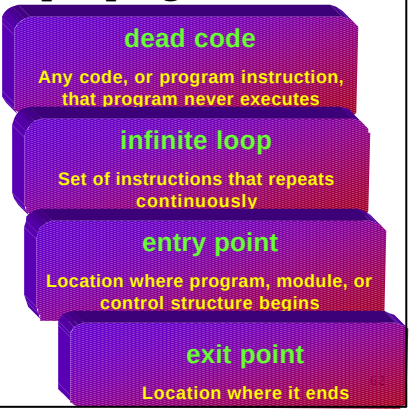
Do-until Control Structure

- Tests condition at end of loop



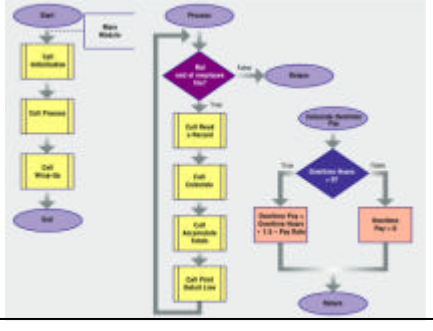
What is a proper program?

- No dead code
- No infinite loops
- One entry point
- One exit point



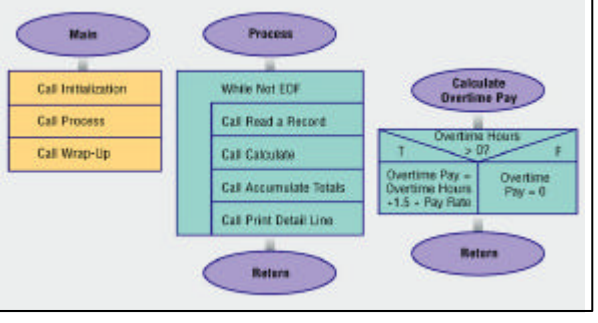
Program Flowchart

- Graphically shows logic in a solution algorithm



Nassi-Schneiderman (N-S) Chart

- Graphically shows logic in a solution algorithm



Pseudocode

- Uses condensed form of English to convey program logic

```
MAIN MODULE:

        CALL Initialization
        CALL Process
        CALL Wrap-Up

END

PROCESS MODULE:

        DO WHILE Not EOF
            CALL Read a Record
            CALL Calculate
            CALL Accumulate Totals
            CALL Print Detail Line
        ENDDO

RETURN

CALCULATE OVERTIME PAY MODULE:

        IF Overtime Hours > 0 THEN
            Overtime Pay = Overtime Hours * 1.5 * Pay Rate
        ELSE
            Overtime Pay = 0
        END IF

RETURN
```


Phase 3: Coding the program

- Translating solution algorithm into a programming language
- Entering programming language code into the computer

```
REM ***************************************
REM * PROGRAM: Compute Gross Pay          *
REM * AUTHOR: Jamie Riverton              *
REM * DATE: December 12, 2003             *
REM ***************************************
REM
REM Main Program - calls lower-level modules
CALL A100.Initialization
CALL B100.Process
CALL C100.Wrap-Up
END
```


Phase 4: Testing and debugging the program

- Goal is to ensure program runs correctly and is error free
- Three types of errors
  - Syntax
  - Logic
  - Run time

Debugging

- Process of locating and correcting syntax and logic errors in program

Phase 5: Formulizing the program

- Programmer performs two activities
  - Reviews program code
  - Reviews documentation

Phase 6: Implementing and maintaining program

- Identify errors
- Identify enhancements
  - Involves modifying existing programs to improve their functionality

References

- Computers in Your Future (Ch. 9)
- Discovering Computers World 2003 (Ch. 13 – 15)