

# **BIT-Semester 2**

## **IT 2405**

# **Systems Analysis and Design**

## **Chapter 9**

# Automated tools and technology

- In the not too distant past the principle tools of the systems analyst were paper, pencil, and flowchart template.
- Today entire suites of automated tools have been developed, marketed and installed to assist systems development teams



# Automated tools and technology

- **Benefits**

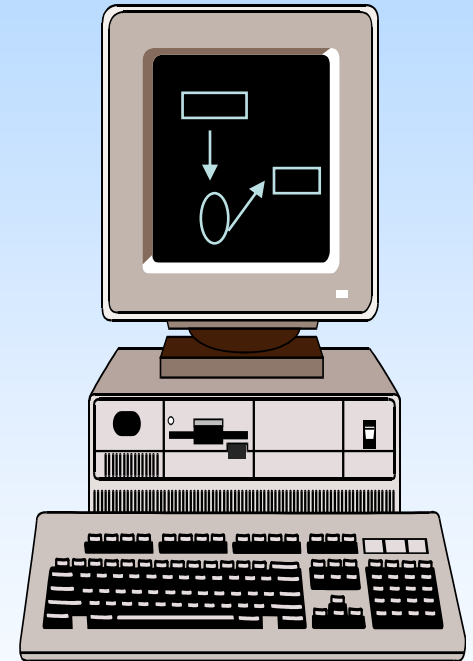
- Improved productivity – through automation of tasks
- Improved quality – because automated tools check for completeness, consistency, and contradictions
- Better and more consistent documentation – because the tools make it easier to create and assemble consistent, high-quality documentation

# Automated tools and technology

- Benefits
  - Reduced lifetime maintenance – because of the aforementioned system quality improvements combined with better documentation
  - Methodologies that really work – through rule enforcement and built-in expertise

# Automated tools and technology

- There are three classes of automated tools for developers.
  - Computer-aided systems modeling
  - Application development environment
  - Project and process managers



# Computer-Assisted Systems Engineering (CASE)

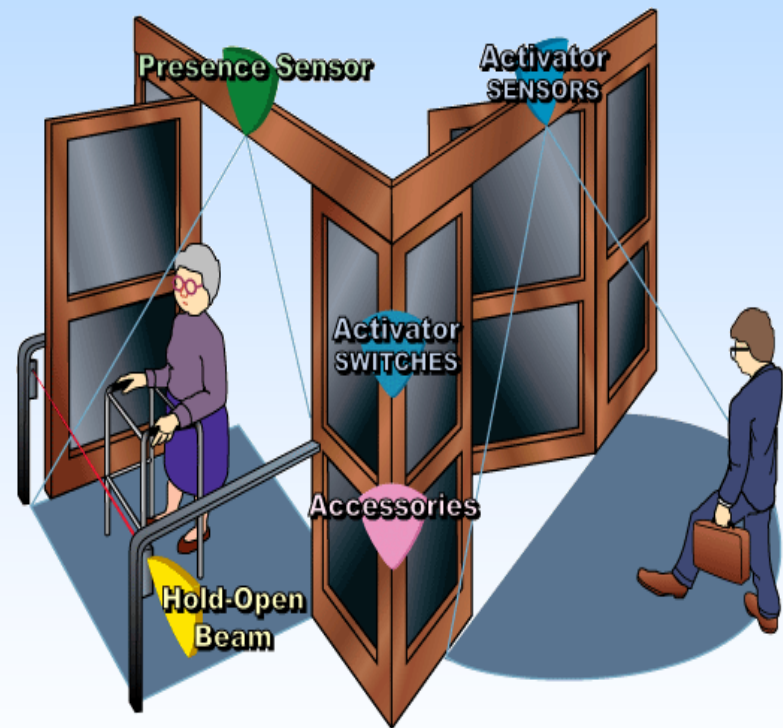
It is filling  
Automatically

- The use of automated software tools that support the drawing and analysis of system models, detailed descriptions and associated specifications.
- Some CASE tools also provide prototyping and code generation capabilities.



# Computer-Assisted Systems Engineering (CASE)

It is the application of information technology to system development activities, technique and methodologies. *Case tools* are programs that automate or support phases of a system development life cycle.



# Computer-Assisted Systems Engineering (CASE)

- CASE Repositories
  - A system developers' database where developers can store system models, detailed descriptions and specifications, and other products of system development.
  - A collection of facilities, for creating system models and documentation
  - Also known as data dictionary and encyclopedia



# Computer-Assisted Systems Engineering (CASE)

- CASE Facilities

To use the repository, the CASE tools provide some combination of facilities

- Diagramming tools: used to draw the system models required or recommended in most system development methodologies

# Computer-Assisted Systems Engineering (CASE)

- CASE Facilities

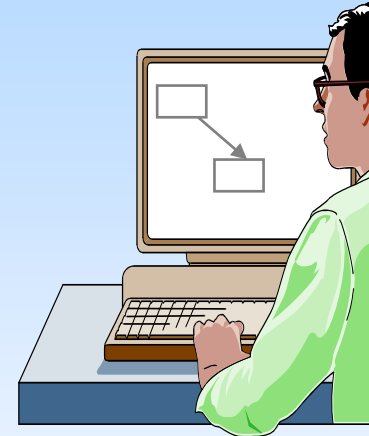
- Diagramming tools:

- ♥ Include capabilities

- to produce ERDs, DFDs etc.
      - to store the details internally
      - to change and redraw,

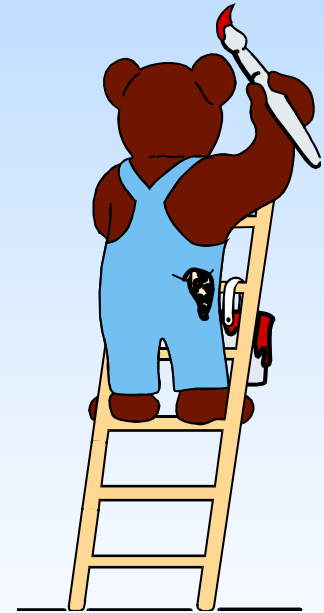
*Eliminates an activity that analysts find both tedious and undesirable.*

- ♥ Perform online syntactic checks and semantic checks



# Computer-Assisted Systems Engineering (CASE)

- CASE Facilities
  - Dictionary tools: used to record, delete, edit, and output detailed documentation and specifications
  - Design tools: used to develop mock-ups of system components such as inputs and outputs



# Computer-Assisted Systems Engineering (CASE)



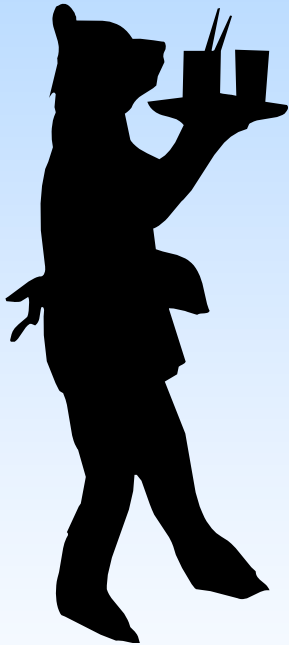
- CASE Facilities
  - Quality management tools: analyze system models, descriptions and specifications, and designs for completeness, consistency, and conformance to accepted rules of the methodologies.

# Computer-Assisted Systems Engineering (CASE)



- CASE Facilities
  - Documentation tools: used to assemble, organize, and report on system models, descriptions and specifications, and prototypes that can be reviewed by system owners, users, designers and builders.

# Computer-Assisted Systems Engineering (CASE)



- CASE Facilities
  - Design and code generator tools: automatically generate database designs and application programs or significant portions of those programs

# Computer-Assisted Systems Engineering (CASE)



- CASE Facilities
    - Testing tools: simulate transactions and data traffic, measure performance, and provide configuration management of test plans and test scripts.
- Eg. Rational Team Test, Rational Purify, Rational Visual PureCoverage

# Computer-Assisted Systems Engineering (CASE)

- Forward and Reverse Engineering
    - Two distinct ways to develop system models.
- Forward Engineering: a CASE tool capability that can generate initial software or database code directly from system models.
- e.g. generate a program directly from a flow chart
- Reverse Engineering: a CASE tool capability that can automatically generate initial system models from software or database code
- e.g. generate a flow chart from an existing program



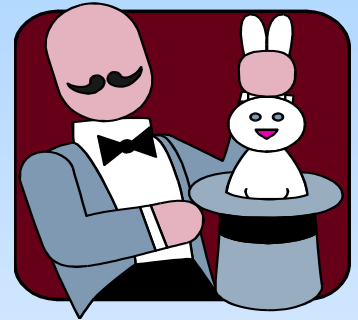
# Computer-Assisted Systems Engineering (CASE)

- Systems designed to automate the stages of Systems Development.
- Capable of bringing clear benefits to Systems Development.



**You will only get the most of it,  
if you can employ  
the Techniques and the Technology  
successfully together.**

# Computer-Assisted Systems Engineering (CASE)



## General Characteristics

- **Break down complexity**

- ♥ Decompose requirements and design into manageable components

- **Presentable to several audiences**

- ♥ End users,

- ♥ Contracting organization paying for the Software development,

- ♥ Developers

# Computer-Assisted Systems Engineering (CASE)

## General Characteristics...

- **Cheaper than building using traditional methods**
- **Verifiable**
- **Maintainable**
- **Graphically Oriented**
  - ♥ Easy to understand a graphical illustration

# Computer-Assisted Systems Engineering (CASE)

## PC CASE Tools

- **Analyst/Designer Tool kit**
- **Automate Plus**
- **CASE 2000**
- **Excelerator**
- **TeamWork**
- **Visible Analyst**
- **Deft**
- **Easy CASE**
- **Oracle \*CASE**
- **Designer 2000**
- **OOTher**
- **IBM Rational Rose**
- **Together**
- **System Architect**
- **Visible analyst**
- <sup>20</sup> **Enterprise Architect**

# Benefits of using CASE tools in Systems Development

- CASE tools improve
  - Quality
  - Productivity
  - The amount of interaction between developers and users
- **However the Organizations must consider**
  - Whether the features of CASE fit the methods they use or
  - Whether they wish to modify their methods to obtain CASE benefits.



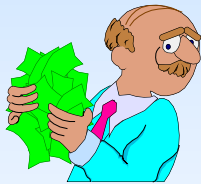
# Benefits of using CASE tools in Systems Development

- Better documentation (mostly because the tools make it easier to create and assemble consistent, high-quality documentation)
- Reduce lifetime maintenance (because of the aforementioned system quality improvements combined with better documentation)
- Reverse Engineering, Forward Engineering support



# Benefits of using CASE tools in Systems Development

**Most Important Elements in the  
Development Process**



**are**



**Skills and Capabilities of the  
*Systems Analysts.***

**Tools assist but do not replace them**

# Application Development Environment (ADEs)

- An integrated software development tool
- Provides all the facilities necessary to develop new application software with maximum speed and quality.
- Also known as integrated development environment (IDE)

e.g. IBM's Websphere, Oracle's Developer, Microsoft's Visual Studio.NET ...etc



# Application Development Environment (ADEs)

- Provide a number of productivity and quality management facilities
  - Programming language or interpreters:
    - help programmers quickly identify and solve programming problems
  - Interface construction tools:
    - help programmers quickly build the user interfaces using a component library
  - Middleware:
    - helps programmers integrate the software being developed with various databases and computer networks

# Application Development Environment (ADEs)

- Provide a number of productivity and quality management facilities (cont.)
  - Testing tools:
    - used to build and execute test scripts that can consistently and thoroughly test software
  - Version control tools:
    - help multiple programmer teams manage multiple versions of a program



# Application Development Environment (ADEs)

- Provide a number of productivity and quality management facilities (cont.)
  - Help authoring tools:
    - used to write online help systems, user manuals, and online training.
  - Repository links:
    - permit the ADE to integrate with CASE tool products as well as other ADEs and development tools.



# Process and Project Management Tools

- CASE tools and ADEs support analysis, design and construction of new information systems and software
- Process manager and project manager application tools are intended to support cross life-cycle activities.
- Project management tools – Microsoft's project, Niku's Open Workbench and Project Manager

# Process and Project Management Tools

- Process manager application
  - An automated tool
  - Helps to document and manage a methodology and routes, its deliverables, and quality management standards.
  - Also known as methodware

# Process and Project Management Tools

- Project manager application
  - An automated tool
  - Helps to
    - plan system development activities,
    - estimate and assign resources,
    - schedule activities and resources,
    - monitor progress against schedule and budget,
    - control and modify schedule and resources, and
    - report project progress.