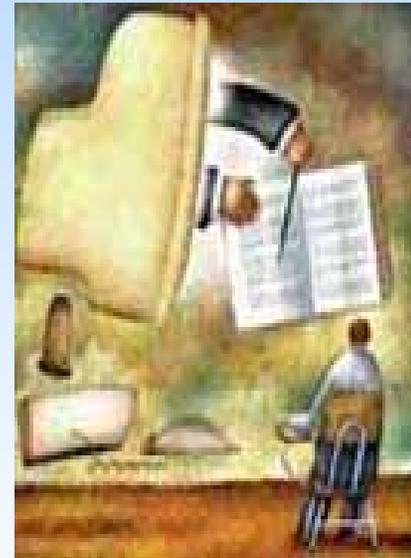


Automated tools and technology

- 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**

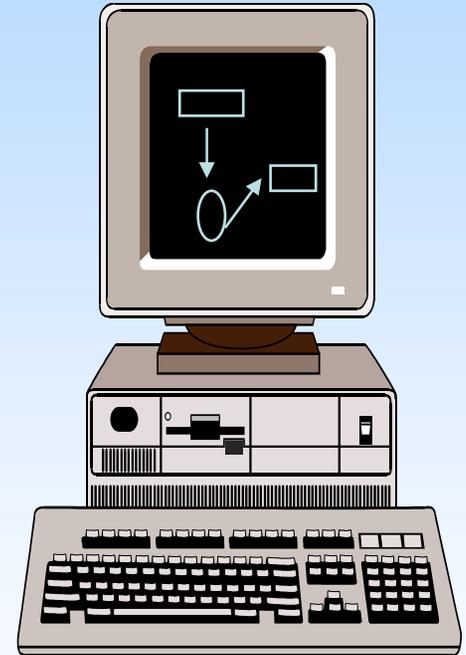
- Improved productivity – through automation of tasks
- Improved quality – because automated tools check for completeness, consistency, and contradictions
- Better and more consistent documentation – because the tools make it easier to create and assemble consistent, high-quality documentation

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)

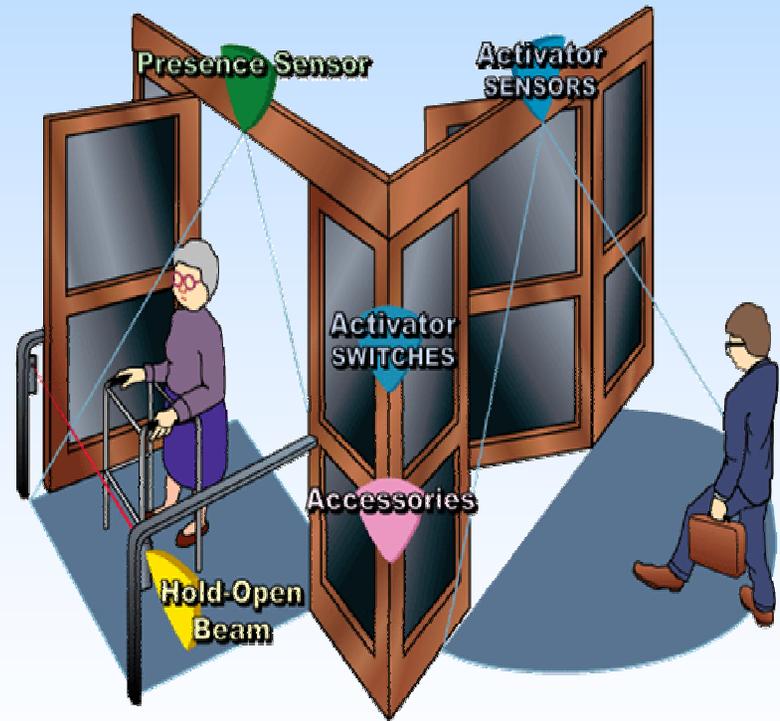
It is filling
Automatically

- 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

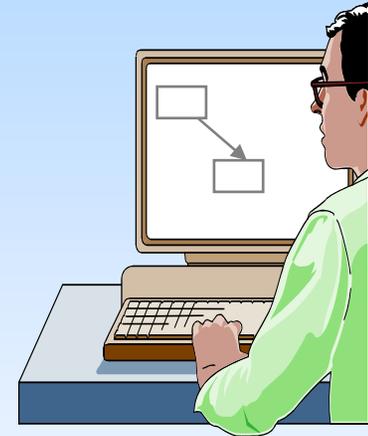
- Diagramming tools:

- ♥ Include capabilities

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

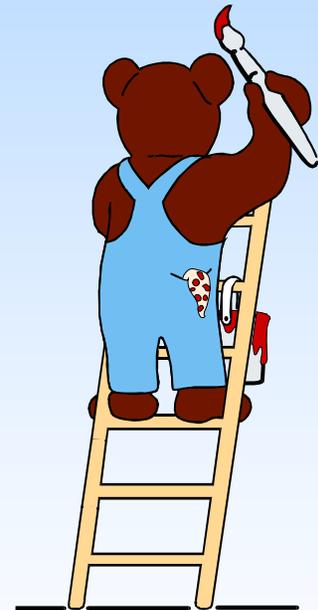
Eliminates an activity that analysts find both tedious and undesirable.

- ♥ 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

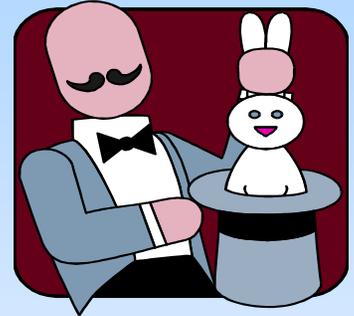
Computer-Assisted Systems Engineering (CASE)

- 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
- Information Engineering Workbench
- TeamWork
- Visible Analyst
- Deft
- Easy CASE
- Oracle *CASE
- Designer 2000
- OOther
- Rational Suit
- Together

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.