

**H
C
I** *Organizational Aspects*

- *Need to understand the nature of organizations*
- *Need to assess the impact of information technology on organizations*
- *Need to know how to achieve organizational change successfully*

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**H
C
I** *The Nature of Organizations*

- *People* - (roles, expectations, motivations)
- *Technology used or created* - (functions, histories, reliabilities, dependencies)
- *Work organization* - the way the organization is structured, the work is allocated and types of groups
- *Organizational culture* - "the way we do things" (stories, rituals, way of behaving, codes of practice and ways of talking)

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**H
C
I** *Understanding the Nature of Organizations*

- *Metaphorical perspective*
 - organization as a machine
 - information processor
 - paperless office
 - automated office
- *Participants' perspective* - how the members of the organization themselves interpret the structures and processes of the organization

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**H
C
I** *The Impact of Information Technology on Organizations*

- *Theoretical approaches:*
 - *Technological determinist* - technology is the single most important factor in determining the success of an organization
 - *Social action* - strategic choices made by management about information technology determine how the organization is structured
- *Reality* - technological factors as well as management goals cause changes to an organization

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**H
C
I** *Impact of Technology Upon Jobs*

- *Technical system as control* - Information technology take work from people and reduce the remainder to tedious and repetitive work.
- *Technical system as tool* - The routine and boring jobs are allocated to computers; the computers provide tools to allow people to be creative and more productive.

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**H
C
I** *Methods for Organizational Change*

- *Scientific management*
- *Sociotechnical system approach*
- *Activity theory*
- *Ethnomethodology*

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**H
C
I** *Scientific Management*

Work obeys scientific laws and can therefore be analyzed using scientific methods

Taylor's scientific principles for management

- Separation of planning and working (management plans; workers carry out plans)
- Choose the best person for the job.
- Determine how a task can be performed the most efficiently.
- Train workers to perform the tasks in the manner outlined.
- Determine the best form of reward for the different tasks.
- Monitor worker performance to ensure compliance.

Taylor, F. W. (1911). Principles of Scientific Management. New York: Harper and Row

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**H
C
I** *Criticism to Scientific Management*

- *the best approach to running organizations*
- *assumes that workers are like machines*
- *dehumanize and alienate the work force*
- *inflexible and unable to cope with rapid change, unexpected developments and competition*

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**H
C
I** *Sociotechnical System Approach*

- *Focus on the creation of largely autonomous workgroups, possessing the necessary equipment and computers to allow a work activity to be completed by one group.*
- **Problems:**
 - difficult to put into practice
 - focus heavily on the 'socio' aspects
 - fail to address the technical systems aspects adequately

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**H
C
I** *Activity Theory*

- **Identifies and analyzes 'breakdowns' and 'contradictions' present at the work activity, that prevent the organization from utilizing existing technology effectively.**
 - **breakdowns** - when there is a conflict between what is assumed to happen and what actually happens
 - **contradictions** - when vicious circles develop that prevent the workers from breaking out of inefficient situations (speedy consultations/quality care)

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**H
C
I** *Ethnomethodology*

- *Focus on how well new technologies support existing work practices.*

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**H
C
I** *The Interaction*

- *Frameworks*
- *Ergonomics*
- *Styles*
- *Context*

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**H
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I** *Norman's Execution - Evaluation Cycle*

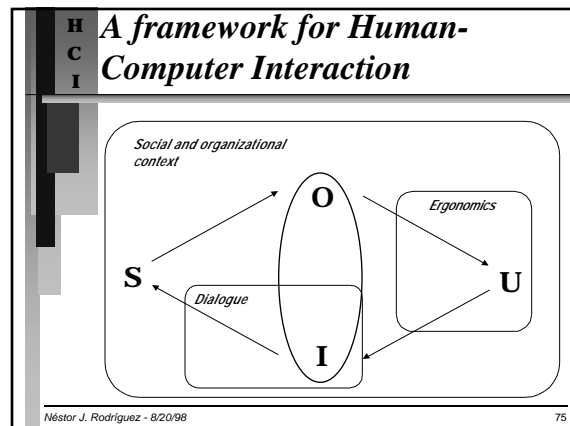
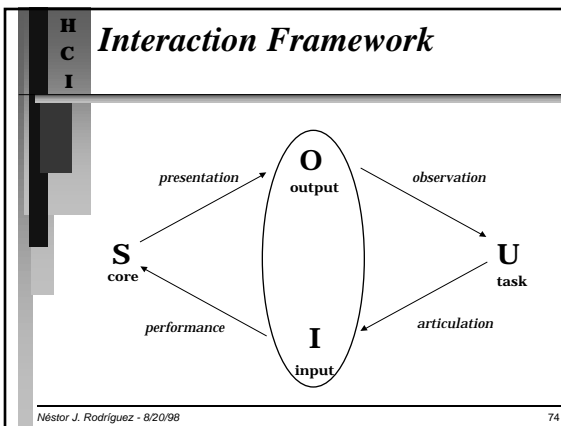
- establishing the goals
- forming the intention
- specifying the action sequence
- executing the action
- perceiving the system state
- interpreting the system state
- evaluating the system state with respect to the goals and intentions

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I** *Execution-Evaluation Cycle (an example)*

- Necesito dibujar un círculo. (establishing the goals)
- Como de una pulgada en el centro de la página. (forming the intention)
- Necesito seleccionar el icon de dibujar círculos, posicionar el cursor en el centro de la pantalla, apretar la tecla de "shift", apretar el botón del mouse y moverlo hacia el lado derecho. (specifying the action sequence)
- Hago las acciones que acabo de especificar. (executing the action)
- Observo la respuesta del sistema en la pantalla. (perceiving the system state)
- Veo que en efecto se está formando el círculo. (interpreting the system state)
- Todavía no alcanza la pulgada de diámetro. Debo continuar la acción. (evaluating the system state)

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**H
C
I** *Interaction Styles*

- command line interface
- menus
- natural language
- question/answer and query dialogue
- form-fills and spreadsheets

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**H
C
I** *Such a wonderful interface!*

The image shows a terminal window with a prompt 'A:>_'. The response is a friendly, natural language message: 'no problema', 'intuitivo', 'bienvenidos los/las novatos/as', 'aquí si podemos explorar', and 'errar es natural'.

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**H
C
I** *Command Line Interface*

- *Booring! (professor's opinion)*
- *Provide accelerated access to the system's functionality*
- *Can be combined to apply a number of tools to the same data*
- *Provide flexibility through the use of options and parameters*
- *Require commands to be memorized*
- *Error-prone*

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**H
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I** *Menus*

- *Rely on recognition rather than recall*
- *Encourage exploration*
- *Need to be logically hierarchically grouped*
- *Naming is critical, specially on menu identifiers (on the menu bar at the top)*
- *Access to menu entries should be easy and safe (not necessarily like in Macs or Windows 95)*

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**H
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I** *Natural Language*

- *Attractive (speech and written input)*
- *Language is ambiguous*
- *Computers systems need to restrict*
- *Users need to be aware of restrictions for the specific domain*
- *The 'natural language' is lost with too much restriction*

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**H
C
I** *Question/Answer and Query Dialogue*

- *Q/A interfaces*
 - *are easy to learn*
 - *have limited functionality*
 - *are good for novice or casual users*
- *Query languages*
 - *use natural language style phrases*
 - *requires knowledge of the domain*
 - *users need to have experience*

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**H
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I** *The "ATH" Machine*

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**H
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I** *Form-fills and Spreadsheets*

- *Form-fills*
 - *useful for data entry*
 - *good for novice users*
- *Spreadsheets*
 - *users are free to manipulate values at will*
 - *distinction between input and output is blurred*

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**H
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I** *Hyperlinking*

- *Hypernodes- multimedia documents (text, audio, video, animation)*
- *Hyperlinks- interconnections of related or unrelated documents*
- *Browsing- looking for something, but you don't know what*
- *Navigation- following links for browsing*
- *Surfing- a water sport*

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**H
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I** *Direct Manipulation*

- *visibility of the objects of interest*
- *incremental action at the interface with rapid feedback on all actions*
- *reversibility of all actions, so that users are encourage to explore without severe penalties*
- *syntactic correctness of all actions, so that every user action is a legal operation*
- *replacement of complex command languages with actions to manipulate directly the visible objects*

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I** *Design Principles Related to Direct Manipulation*

- *Afordance: what sort of operations and manipulations can be done to a particular object*
- *Constraints: limits of what can be done with an object*
 - *limits of a scroll bar movement*
 - *menu entries are fixed in most cases*
- *Mappings: should appear natural and intuitive to the users*
 - *wastebasket (good for throwing away files, bad for ejecting disks)*
- *Feedback: need no introduction (back channels)*

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**H
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I** *WIMP Interface*

- *Windows*
- *Icons*
- *Menus*
- *Pointers*
 - *buttons*
 - *palettes*
 - *dialogue boxes*

} **widgets**

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**H
C
I** *WIMP Issues*

- *Pointers- object manipulators*
 - *mouse driven actions (point, click, double click, shift click, press, drag)*
 - *shapes*
- *Icons- objects that attempt to suggest their function through an image*
 - *images, buttons*
- *Menus- list of actions that can be performed*
 - *lists of phrases, palettes*
- *Windows- defined areas for interaction*
 - *sizing, moving, scrolling, focus*

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**H
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I** *Useful WIMP Stuff*

- *copy-paste, cut-paste, drag & drop*
- *clipboard*
- *dialogue boxes*
- *undo, cancel*
- *trash can*
- *on-line help*
- *print preview*
- *desktop*
- *defaults*

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**H
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I** **Task Analysis**

A process that identifies and analyzes tasks performed by humans as they interact with a system

- the things they do
- the things they act on
- the things that they need to know

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**H
C
I** **The Task Analysis Process**

- Information and data collection
- Data analysis
- Task description

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**H
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I** **Data and Information Collection**

- Documentation
- Observation
 - informal
 - think aloud
 - walkthrough
- Interviews
- Questionnaires

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**H
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I** **Documentation**

- Indicate how people are supposed to perform tasks
 - manuals
 - instruction booklets
 - training materials
 - job descriptions
 - rule books
- Are useful to identify things that people do that they are not supposed to (the why? could be revealed with an interview).

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**H
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I** **Observation Techniques**

- **Reveal information that cannot be acquired in any other way.**
 - detailed physical task performance data
 - social interactions
 - behavior patterns
 - environmental influences (noise, light, interruptions)
- **Before conducting sessions:**
 - try to predict the information that will be extracted from the data
 - conduct a pilot session

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**H
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I** **Observation Aspects to be Considered**

- **Intrusion**
 - observer unobserved
 - observer observed
 - observer participant
- **Recording methods**
 - paper and pencil
 - audio/video recording
 - computer logging
 - user notebook

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I** *Post Observation Analysis*

- *Identify and categorized the observed events.*
- *Count the events.*
- *Relate the events to the task and the system state at the time.*
- *Produce a transcript of the audible content.*

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I** *Think Aloud*

- *The users verbalize:*
 - *what they believe is happening*
 - *why they take an action*
 - *what they are trying to do*
- *The information provided is often subjective and may be selective.*
- *Being observed and having to describe what's being done could change how people normally do things.*

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**H
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I** *Walkthroughs*

- *The subject performs some sort of demonstration of a task without necessarily undertaking the task.*
- *The subject is asked to comment or is questioned on a replay of his/her recorded actions while performing a task.*
- *It helps to explain the actions of the subjects.*
- *The experimenter needs very little specialist training.*
- *The subject need to be skilled in the domain.*

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**H
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I** *Interviews*

- *Unstructured - good for early stages of data collection*
- *Structured - for general collection of task-based information*
- *The interviewer need to have interviewing skills*
- *The interviewee should be an expert of the domain.*
- *The purpose of the interview should be made clear to the interviewee.*

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**H
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I** *Before the Interview*

- *Make an appropriate selection of questions.*
- *Determine an optimum sequence of questions.*
- *Select an appropriate place for the interview so that interviewee is at ease (at the workplace or near it).*
- *If the interview will be video/audio tapped, get interviewee consent before you get to the place of the interview.*

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**H
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I** *Don't use Interviews to Find Out:*

- *If people would use a new feature*
- *What features people would like*
- *How much people like/want one option*
- *How to design a user interface*
- *Any design issues*
- *Anything that makes interviewee imagine hypothetical situations*

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Use Interviews to:

- focus goals of products
- determine functionality
- evaluate priorities
- develop user model
- identify biggest problems
- determine priorities for next release

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Asking the right questions

- Start with general questions (demographics, high-level tasks, organization practices)
- Move on to common tasks and procedures
- Eventually focus on more specialized tasks
- Avoid providing details of your proposed plans
- Avoid leading the interviewee with possible answers
- Avoid giving your opinions

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Interviewing Tips

- The interview is about them, not you!
- Ask open, unbiased questions
- Don't use the news reporter approach
- Ask the questions and let them answer
- Follow up
- Adjust your questions to their previous answer
- Ask questions in a language they understood
- Be flexible
- Listen to their complains, but look for other problems

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I**

Algunos Ejemplos

- P: ¿Has confrontado algún problema con este programa?
- R: Sí, cuando le da la gana se tranca y me sale una bombiita.
- P: Si no molestara eso, yo me prendo cada vez que eso me pasa.
- P: ¿Usted no cree que Victor Fajardo al querer implantar la enseñanza en el idioma Inglés demuestra que no ha tomado cursos de pedagogía?
- P: ¿No le parece que el "touchpad" es mas difícil de usar que el "mouse"?
- P: ¿Cuál te es más facil de utilizar, el "touchpad" o el "mouse"?
- R: El mouse.
- P: ¿Por qué?

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Sorting and Classification

- Make a list of task objects.
- Write each one on a card or a piece of paper.
- Ask an expert (in the domain) to sort them in piles of similar objects.
- Depending of the sizes of the groups the expert could be asked to sub-divide the groups or create larger groups.
- The expert could be asked to explain why he/she came up with a particular arrangement.

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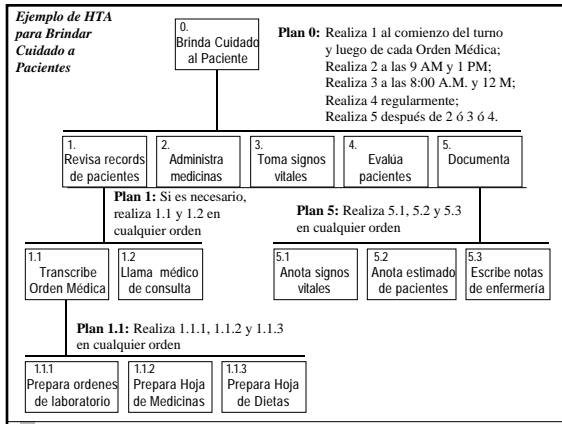
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The Hierarchical Task Analysis (HTA) Method

Is a task decomposition method that produces a hierarchy of tasks and sub-tasks and plans which are needed to accomplish a system's goal.

- goal - the desired state of the system
- tasks - the different things that people must do within a system
- plans - state the conditions which specify when each of a set of sub-tasks should be carried out.

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Practical Considerations in the Realization of a HTA

- Establish the purpose of the analysis and the rules to be used for deciding where the analysis should stop.
- State the main goal.
- When the tasks are complex get the help of a person that knows the tasks well.
- Use different sources of information

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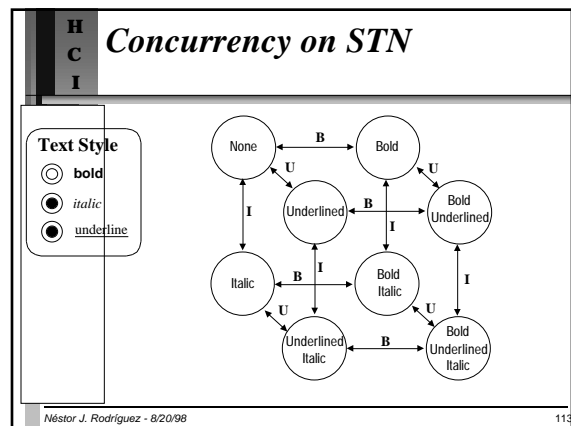
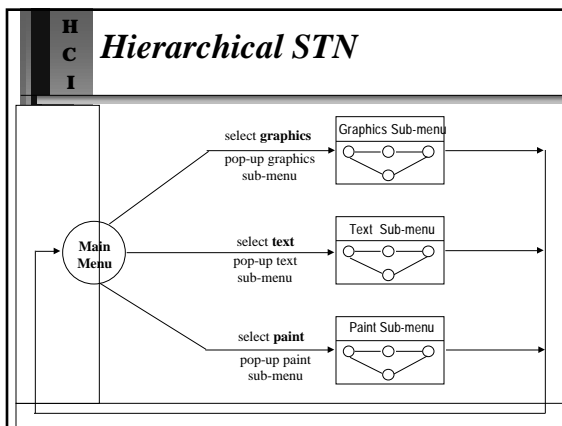
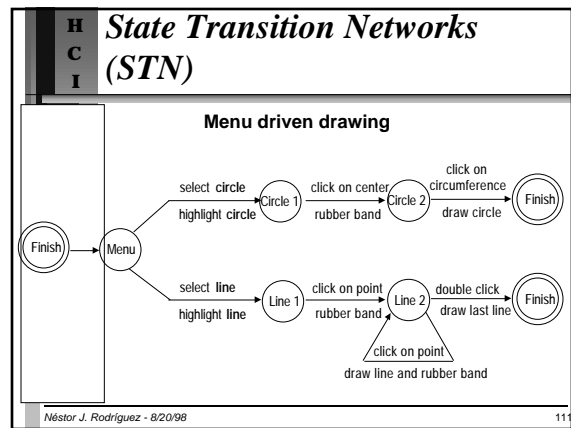
Dialogue

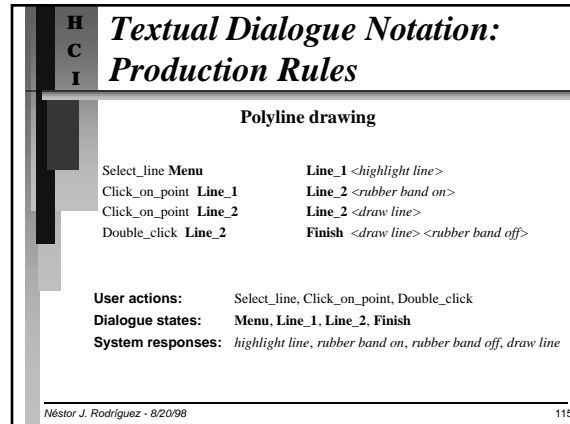
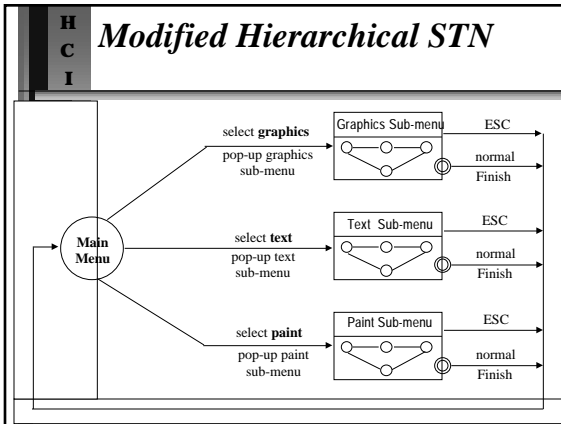
Structure of the conversation between the user and the computer system

Levels of computer language

- lexical** - the shapes of icons on the screen and the actual keys pressed
- syntactic** - the order and structure of inputs and outputs
- semantic** - the meaning of the conversation in terms of its effect on the computer's internal data structure and/or the external world

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- ### H C I
- ## Things to Check for in Dialogues
- **Completeness** - look for forgotten actions while in a state (do nothing is the safe solution)
 - **Determinism** - look for situations where identical actions executed on a state get the dialogue to different states
 - **Reachability** - check if the dialogue is fully connected
 - **Reversibility** - is it possible to get back to the previous state?
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