Curriculum Development Centers Program

Awardee of The Office of the National Coordinator for Health Information Technology

Fundamentals of Health Workflow Process Analysis and Redesign

Process Mapping: ISO 5807

Lecture b

This material Comp10_Unit3b was developed by Duke University, funded by the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology under Award Number IU24OC000024.

Process Mapping: ISO 5807 Learning Objectives

1. Create a process flowchart for a health care system (or system component) using appropriate ISO 5807 symbols and conventions. (Lecture b)
2. Create context and data flow diagrams for a health care system (or system component) using appropriate Yourdon symbols and conventions (Lecture c)
3. Choose the correct scope and detail level for a process flowchart and data flow diagram (Lecture b, c)
4. Read and interpret Gane-Sarson data flow diagram (Lecture d)
5. Read and interpret an entity relationship diagram in crow's foot notation (Lecture e)
6. Read and interpret UML class, activity, and state diagrams (Lecture f)

Process Mapping: ISO 5807 Lecture b - Topics

- Standard ISO 5807 process diagramming symbols and conventions
- Reading an ISO 5807 flowchart in terms of the information that could be generated and the workflow steps that are being communicated
- Create ISO 5807 flowcharts for a health care system (or system component) using correct symbols and conventions

Methods for Diagramming Processes

Process Aspects	ISO 5807	Yourdon	Gane-Sarson	UML	E-R diagram
Context		X	X	X	
Process steps	**X**			X	
Data flow steps	**X**	X	X	X	
Information content		text	text	X	X
Data transformation	**X**	X	X	X	
Flow control and state	**X**		text	X	
Roles involved	**X**		X	X	

Table 3.2 Methods for Diagramming Processes

*UML extends beyond basic process features and models other aspects such as sequence, communication, and interrelationships. We do not cover these aspects here.

Flowchart

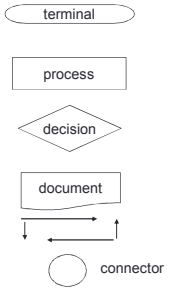
- A graphic depiction of the steps or activities that constitute a process
- ISO 5807: 1985 standard
  - Standard symbols for flowcharts

"Graphical representation of the definition, analysis, or method of solution of a problem in which symbols are used to represent operations, data, flow, equipment, etc." (ISO, 1985)

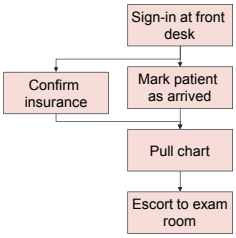
Flowchart

- Constructed from standard symbols
- Used to communicate processes
- Software functionality important in flowcharting
  - The shapes available
  - Connectors that attach to the shapes
  - Connectors facilitate editing the flowchart

Flowchart Symbols



ISO 5807 section 9.2.1 Basic Process Symbol

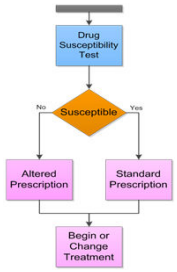


"This symbol represents any kind of processing function, for example, executing a defined operation or group of operations resulting in a change in value, form or location of information, or in the determination of which one of several flow directions is to be followed." (ISO, 1985)

ISO 5807 section 9.2.2.4 Decision

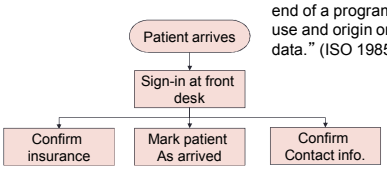
"This symbol represents a decision or switching type function having a single entry but where there may be a number of alternative exits, one and only one of which may be activated following the evaluation of conditions defined within the symbol. The appropriate results of the evaluation may be written adjacent to the lines representing the paths." (ISO, 1985)

Decision symbols can show nominal decisions (yes/no), or decisions with multiple possible outcomes.



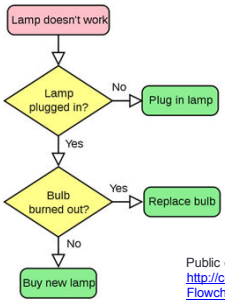
ISO 5807 section 9.4.2 Terminator

Example: Terminator symbol use



"This symbol represents an exit to, or an entry from, the outside environment, for example, start or end of a program flow, external use and origin or destination of data." (ISO 1985)

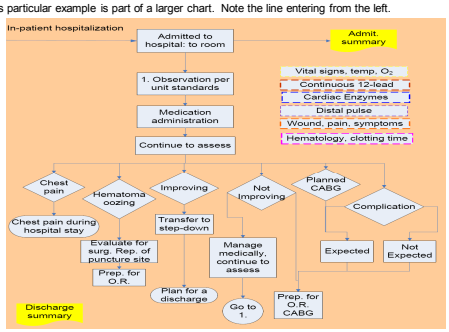
Review: What's Wrong with this Flowchart?



Public domain image obtained from http://commons.wikimedia.org/wiki/File:Lamp Flowchart.png

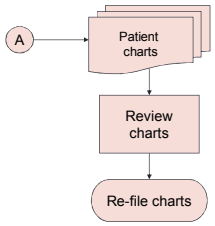
Decision With Multiple Outcomes

This particular example is part of a larger chart. Note the line entering from the left.



ISO 5807 Section 9.1.2.4 Document

Example of document symbol use



"This symbol represents human readable data, the medium being, for example, printed output, an OCR [optical character recognition] or MICR [magnetic ink character recognition] document, microfilm, tally roll, data entry forms." (ISO 1985)

Manual input versus manual operation

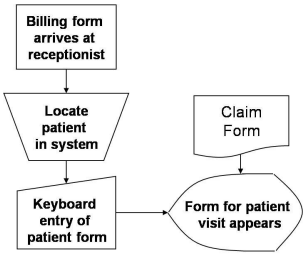
ISO 5807 section 9.1.2.5 Manual input

"This symbol represents data, the medium being of any type where the information is entered manually at the time of processing, for example, on-line keyboard, switch settings, push buttons, light pen, bar-code wand." (ISO 1985)

ISO 5807 section 9.2.2.2 Manual operation

"This symbol represents any process performed by a human being." (ISO 1985)

Example: Manual Operation and Manual Input

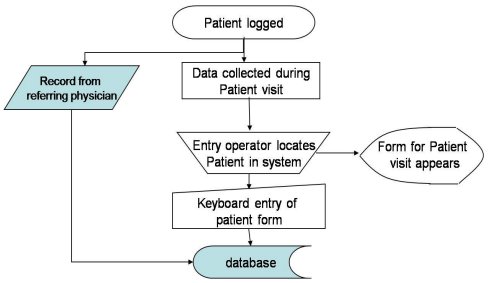


Data Symbols

ISO 5807 section 9.1.1.1 Data "This symbol represents data, the medium being unspecified." (ISO 1985)

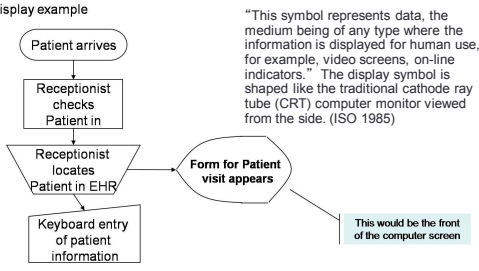
ISO 5807 section 9.1.1.2 Stored data "This symbol represents stored data in a form suitable for processing, the medium being unspecified." (ISO 1985)

Data Symbol Example



ISO 5807 section 9.1.2.8 Display

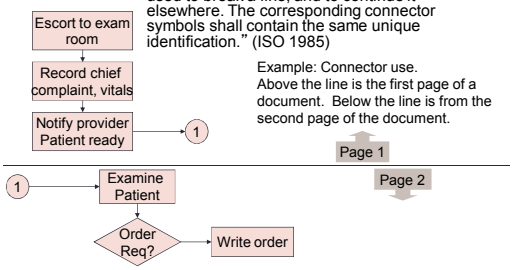
Display example



"This symbol represents data, the medium being of any type where the information is displayed for human use, for example, video screens, on-line indicators." The display symbol is shaped like the traditional cathode ray tube (CRT) computer monitor viewed from the side. (ISO 1985)

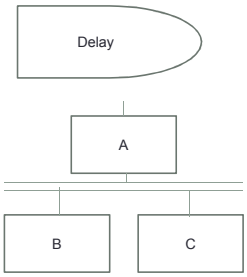
ISO section 9.4.1 Connector

"This symbol represents an exit to, or an entry from, another part of the same flowchart, and is used to break a line, and to continue it elsewhere. The corresponding connector symbols shall contain the same unique identification." (ISO 1985)



Example: Connector use. Above the line is the first page of a document. Below the line is from the second page of the document.

Delay



The symbol used to represent a delay in a process looks like a "bullet". Although not listed in ISO 5807, this symbol is commonly used because in logic diagrams, it represents an "and gate". An "and gate" denotes that two or more things (thing 1 AND thing 2, two inputs) have to happen before proceeding.

Two parallel lines are used to denote that things above them must be done before things below them can be done. In the diagram, processes B and C cannot start until process A has been completed. Adapted from (ISO 1985).

Non-Symbol Flowcharting Standard Conventions

This section covers:

- Use of text descriptions
- Detail level
- Flow direction
- Lines

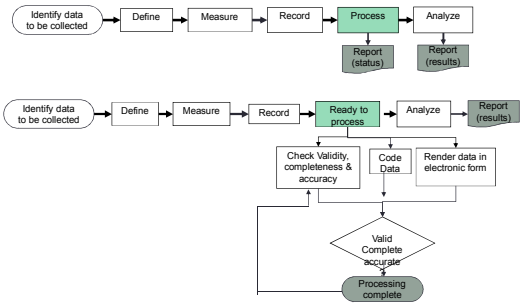
Text Descriptions

Text descriptions are done using "annotations" aka "call-outs." This keeps the text in the box to a minimum so the chart is more readable. Lengthy text descriptions can be referenced to another page or footnote if necessary.

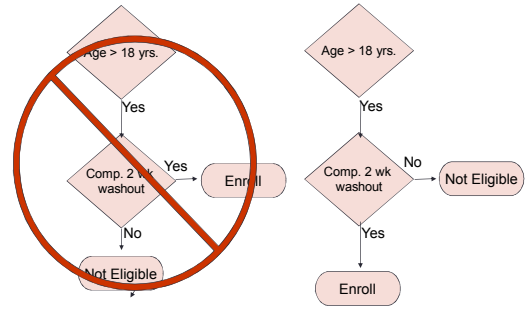
This is a call-out

If text descriptions refer to more than one box in a flowchart, a dotted line can be drawn around the steps that the text describes or refers to.

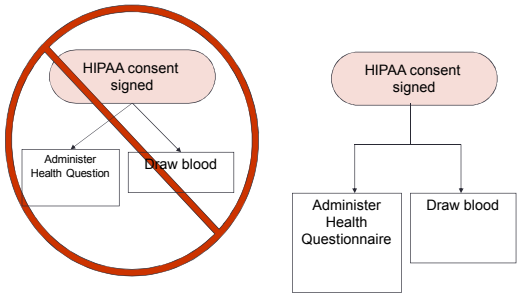
Detail Level



Flow



Flow



Lines

- A solid line is used to denote data or process flow. Arrows represent the direction of the flow.

- A dashed line is used to denote an alternate path. Arrows represent the direction of the flow.

- A jagged line is used to denote data transfer by a telecommunications link. Arrows represent the direction of the flow.

- Two parallel lines denote a synchronization between two parallel processes. i.e. that the things above it have to happen and all come to the denoted state before the things below it can occur. There are no arrows on synchronization lines.

All lines that represent flow based on decisions should be labeled. Lines should run up & down or left and right. Do not use diagonal lines.

Process Mapping: ISO 5807 Summary – Lecture b

At this point you should be able to

- Recognize and use ISO 5807 standard symbols and conventions,
- Read and interpret an ISO 5807 flowchart,
- Create ISO 5807 flowcharts for a health care system (or system component) using correct symbols and conventions.

Process Mapping: ISO 5807 References – Lecture b

References

- ISO/ANSI 5807 Information processing - Documentation symbols and conventions for data, program and system flowcharts, program network charts and system resources charts. 1985.

Charts, Tables, Figures

3.2 Table: Nahm, M., Duke University, 2012.

Process Mapping: ISO 5807 References – Lecture b

Images

Slide 7: Image of Symbols used in standard flowcharting. Nahm M. Duke University, 2012
Slide 8: Basic process symbol utilization in a flowchart. Nahm M. Duke University, 2012
Slide 9: Flowchart showing decision tree about drug testing. N ahm M. Duke University, 2012
Slide 10: Use of the Terminator symbol in workflow process diagramming. Nahm M. Duke University, 2012
Slide 11: ikrant (own work). 2006). *A flowchart about testing lamp working.* [flowchart]. Retrieved February 27, 2012 from http://commons.wikimedia.org/wiki/File:LampFlowchart.png
Slide 12: Flowchart of decision tree for patients coming into a hospital. Nahm M. Duke University, 2012
Slide 13: Example of document symbol use. Nahm M. Duke University, 2012
Slide 14: Definition of manual input versus manual operation. Nahm M. Duke University, 2012
Slide 15: Example: Manual Operation and Manual Input. Nahm M. Duke University, 2012.
Slide 16: Symbols for Data and stored data. Nahm M. Duke University, 2012
Slide 17: Data symbol example. Nahm M. Duke University, 2012.
Slide 18: Example of the Display symbol. Nahm M. Duke University, 2012
Slide 19: Example of the Connector symbol. Nahm M. Duke University, 2012
Slide 20: The Delay symbol. Nahm M. Duke University. 2012.
Slide 22: Annotations or "call outs". Nahm M. Duke University, 2012.
Slide 23: Example of Detail Level in flow charts. Nahm M. Duke University, 2012.
Slide 24: Example of appropriate and incorrect Flow in a chart. Nahm M. Duke University, 2012.
Slide 25: Flow: From top to bottom or R to L. Nahm M. Duke University, 2012.
Slide 26: Use of line in flow diagrams. Nahm M. Duke University, 2012.