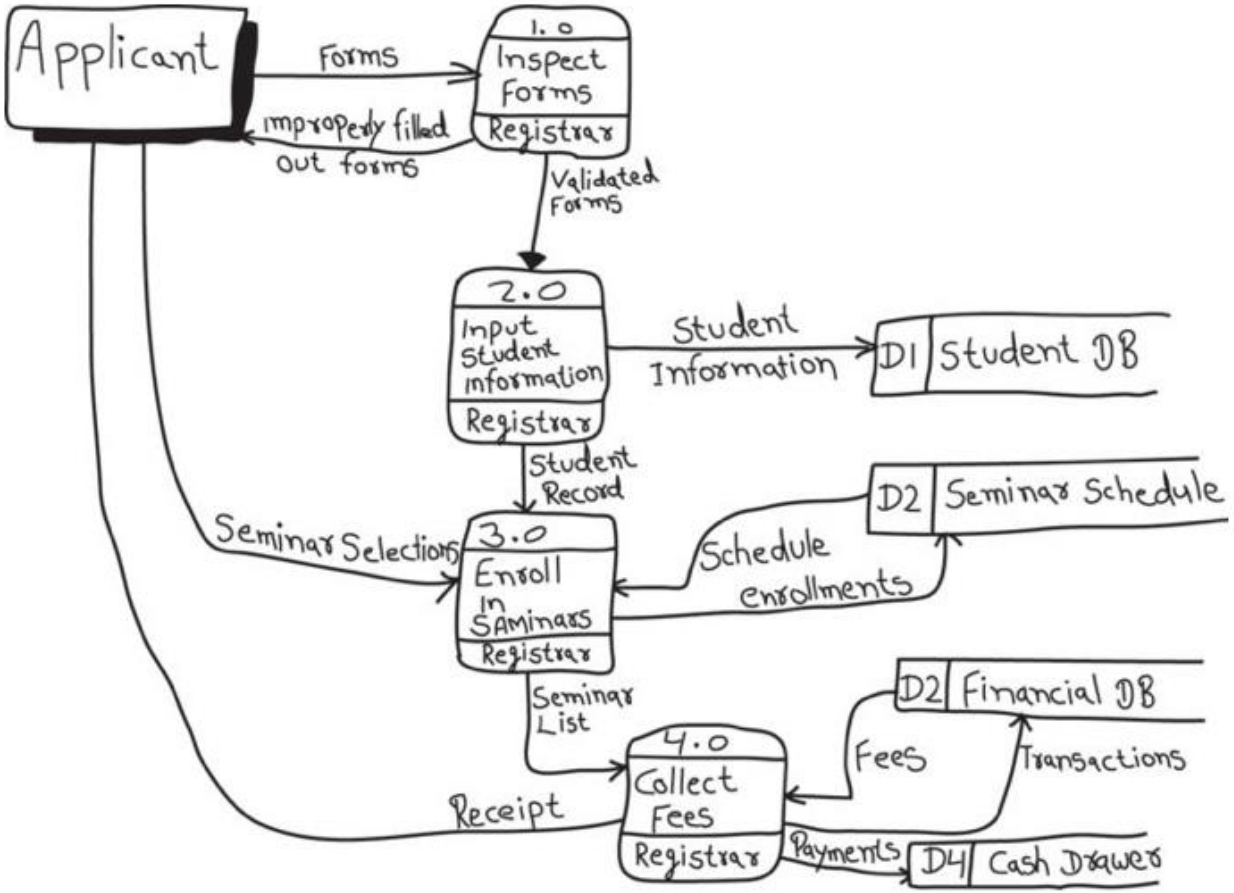
Chapter 9

Business Process Modeling

Data Flow Diagrams

- DFDs show the flow of data from external entities into the system, show how the data move from one process to another, and data's logical storage.
- Squares representing external entities, which are sources or destinations of data.
- Rounded rectangles representing processes, which take data as input, do something to it, and output it.
- Arrows representing the data flows, which can be either electronic data or physical items.
- Open-ended rectangles representing data stores, including electronic stores such as databases or XML files and physical stores such as filing cabinets or stacks of paper.
- DFDs can be used to model processes that are purely physical, purely electronic, or more commonly a mix of both.

DFD Example


Applicant
Forms
1.0
Inspect Forms
Registrar
Improperly filled out forms
Validated Forms
2.0
Input Student information
Registrar
Student Information
D1 Student DB
Student Record
D2 Seminar Schedule
Seminar Selections
3.0
Enroll in SAminars
Registrar
Schedule enrollments
Seminar List
D2 Financial DB
4.0
Collect Fees
Registrar
Fees
Transactions
Receipt
Payments
D4 Cash Drawer

DFD Modeling Rules

- All processes must have at least one data flow in and one data flow out.
- All processes should modify the incoming data, producing new forms of outgoing data.
- Each data store must be involved with at least one data flow.
- Each external entity must be involved with at least one data flow.
- A data flow must be attached to at least one process.

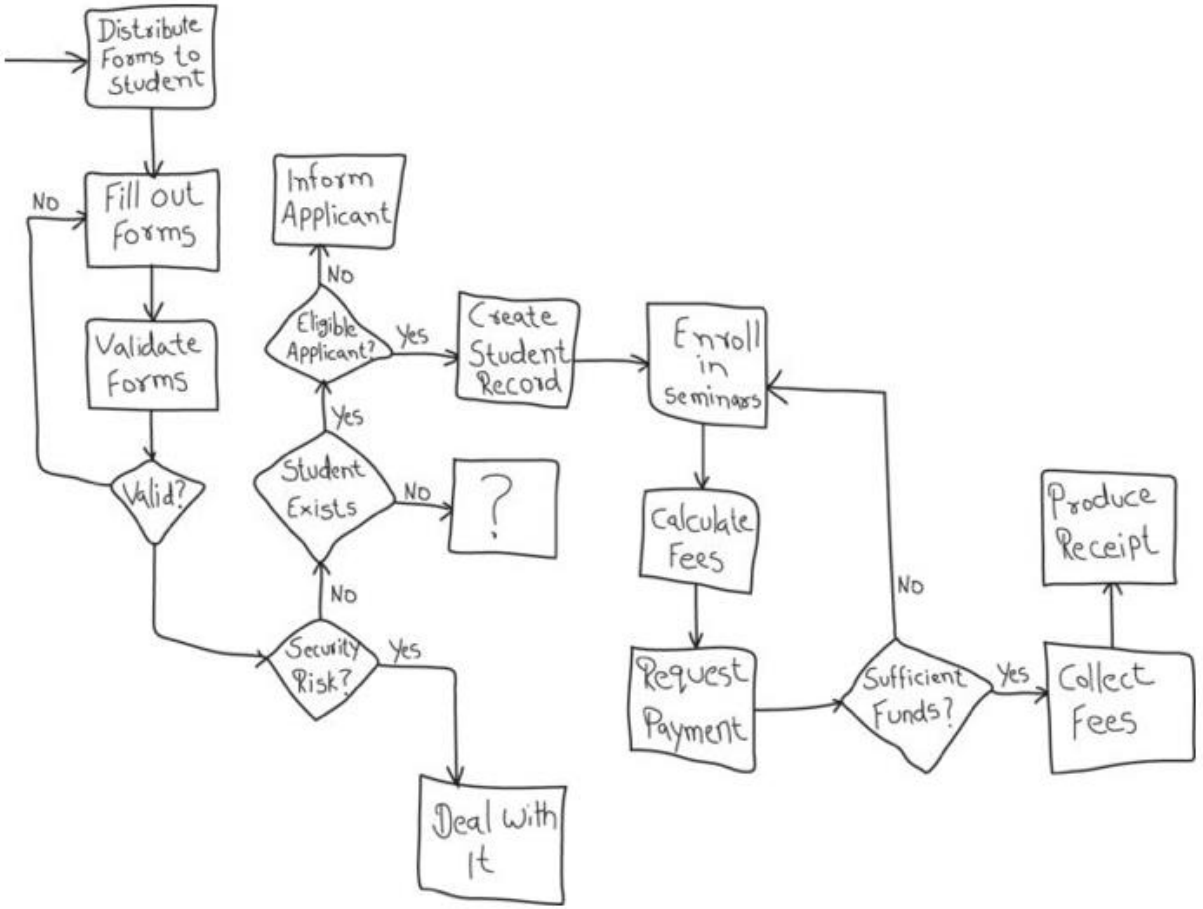
Flow Charts

- There are three symbols depicted on this flowchart:
  - Squares that represent activities or tasks,
  - Diamonds that represent decision points, and
  - Arrows that represent flow of control.
- Unlike DFDs, which are used to describe data flow within a system, flowcharts are typically used to describe the detailed logic of a business process or business rule.

UML Activity Diagrams

- Typically used:
  - For business process modeling,
  - For modeling the logic captured by a single use case or usage scenario, or
  - For modeling the detailed logic of a business rule.
- The object-oriented equivalent of flowcharts and DFDs from structured development.

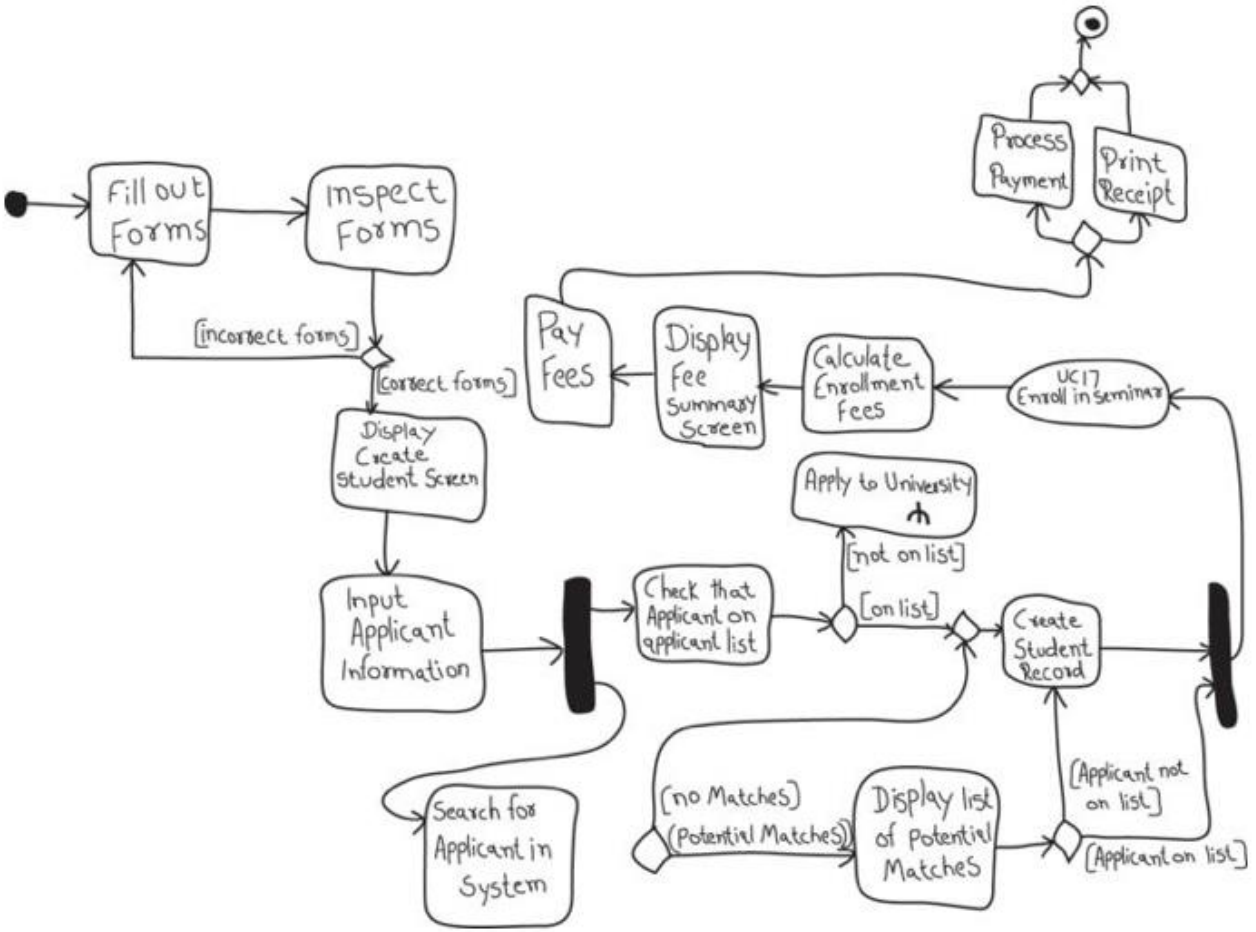
Flowchart Example



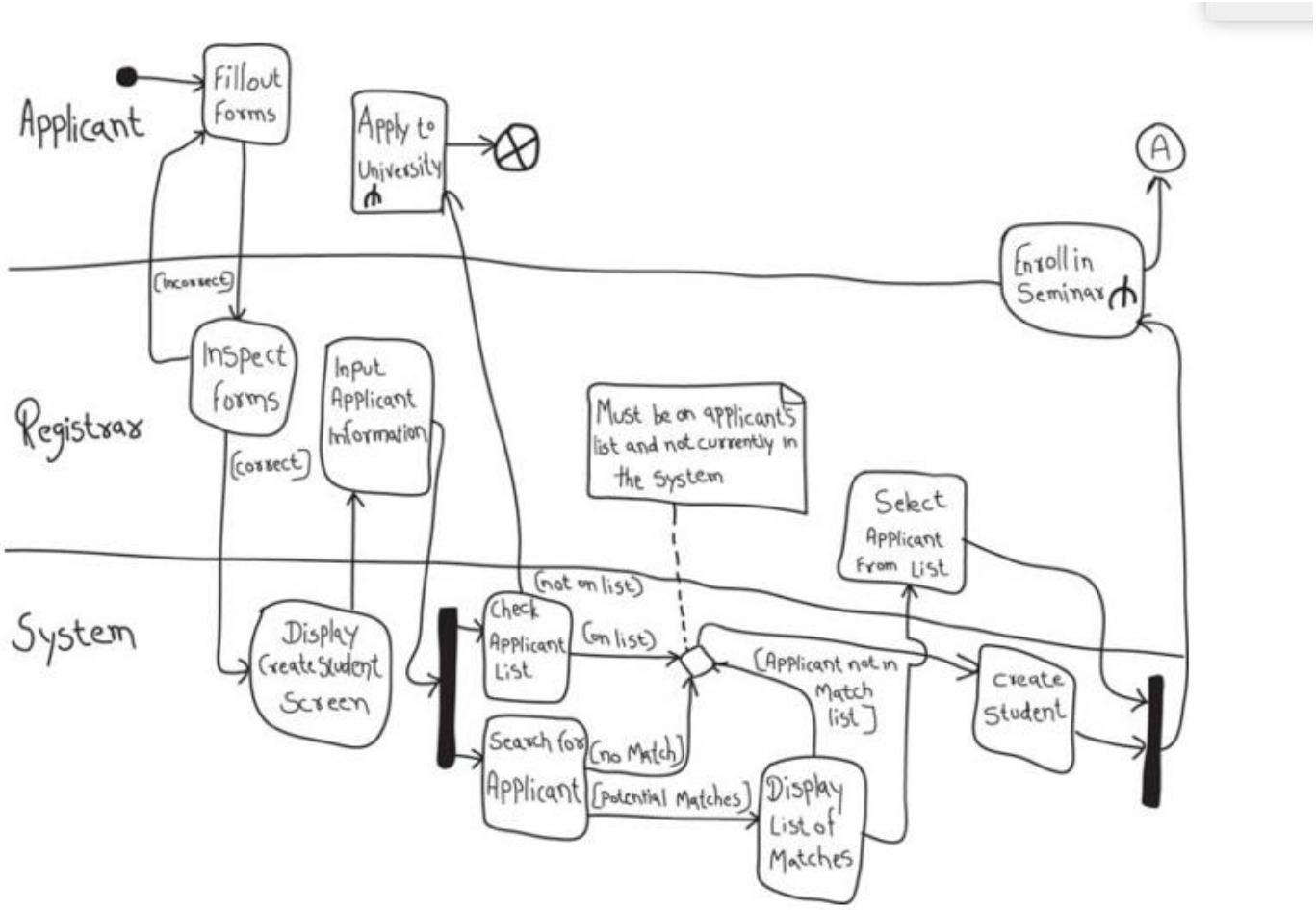
Activity Diagram Notation

- Initial node. The filled circle is the starting point of the diagram. MUST BE ONE.
- Activity final node. The filled circle with a border is the ending point. MUST BE ONE OR MORE.
- Activity. The rounded rectangles represent activities that occur. An activity may be physical, such as Inspect Forms, or electronic, such as Display Create Student Screen.
- Flow/ edge. The arrows on the diagram.
- Fork. A black bar with one flow going into it and several leaving it. This denotes the beginning of parallel activity.
- Join. A black bar with several flows entering it and one leaving it. This denotes the end of parallel processing.
- Condition. Text such as [Incorrect Form] on a flow, defining a guard that must evaluate to true in order to traverse the node.
- Decision. A diamond with one flow entering and several leaving. The flows leaving include conditions although some modelers will not indicate the conditions if it is obvious.
- Merge. A diamond with several flows entering and one leaving. The implication is that all incoming flows must reach this point until processing continues.
- Partition. Also called swim lanes, indicating who/ what is performing the activities.

Activity Diagram Example



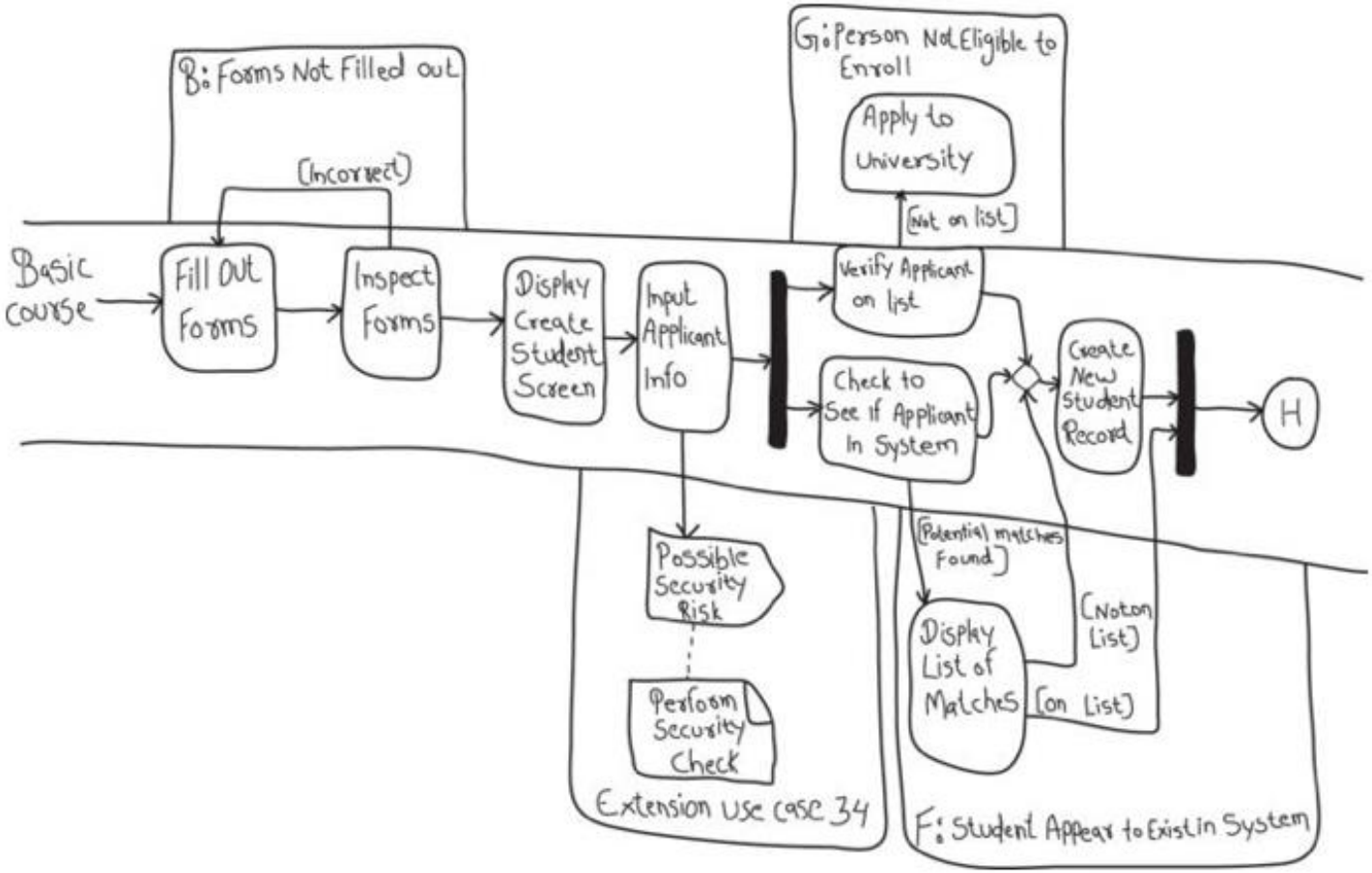
Activity Diagram Partitioned By Actor



Activity Diagrams Are Not Just For Individual Use Cases

- Activity diagrams that cross several use cases or that address just a small portion of a use case can also be drawn.
- You can also use activity diagrams without use cases being involved at all;
  - for example, a pair of eXtreme Programming (XP) developers could draw activity diagrams with their customer (the XP term for stakeholder) to analyze a user story or a larger business process that a user story.

Activity Diagram Partitioned By Course Of Action



Additional Notation

- The hourglass symbol represents time, and because all of the flows going into a join must occur before processing can continue, the way that you would read this is that the schedules must be printed and it must be at least April 1.
- The square on the side of the Determine Mailing List activity in Fig. 9.7 is called a pin, and the one on the side of the Print Mailing Label activity is a parameter.
- The circle on the flow indicates a transformation; in this case, the people on the mailing list are sorted by zip code (the post office charges less for bulk mailings sorted in this manner) and then each individual is listed so that a mailing label can then be printed for each individual.
- The Labeled Schedule box is an example of an object being passed between activities.

Additional Notation Example