Activity + Interaction Diagrams

LECTURE 5

Activity Diagram

- Activity diagrams describe the workflow behavior of a system.
- Activity diagrams are similar to state diagrams because activities are the state of doing something.
- The diagrams describe the state of activities by showing the sequence of activities performed.
- Activity diagrams can show activities that are conditional or parallel.

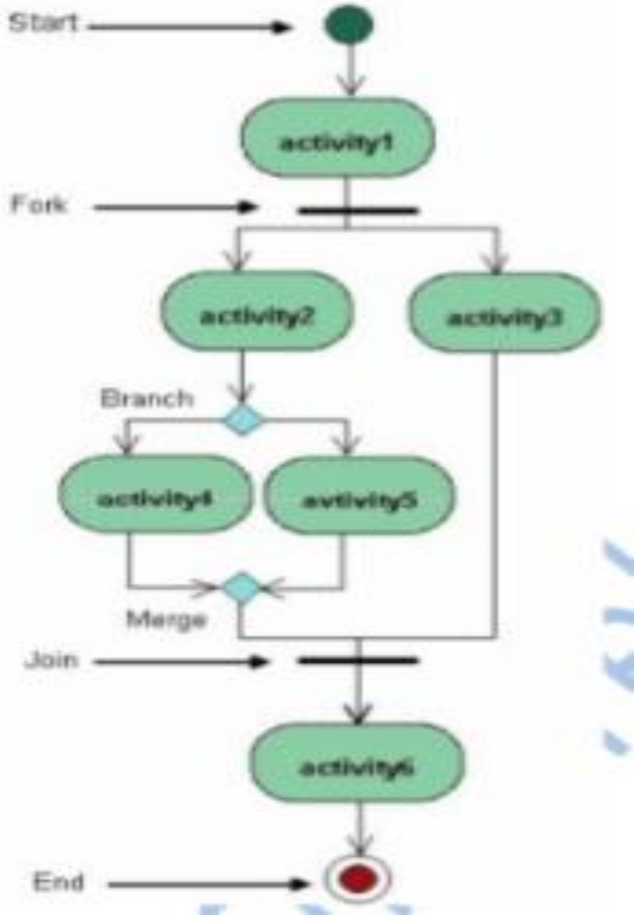
When to Use:

- The main reason to use activity diagrams is to model the workflow behind the system being designed.
- Activity Diagrams are also useful for: analyzing a use case by describing what actions need to take place and when they should occur;
- Activity diagrams do not give detail about how objects behave or how objects collaborate.

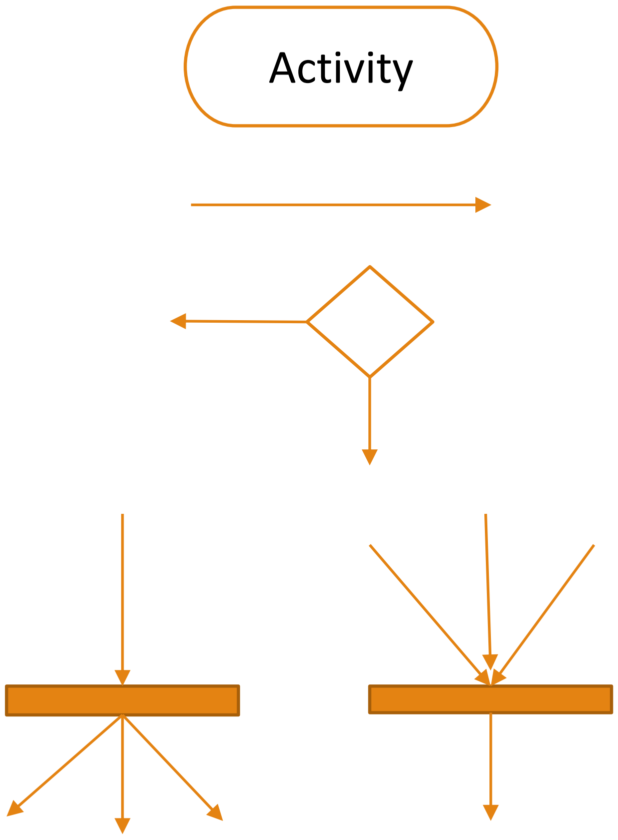
How to Draw Activity diagrams

- Activity diagrams show the flow of activities through the system.
- Diagrams are read from top to bottom and have branches and forks to describe conditions and parallel activities.
- A fork is used when multiple activities are occurring at the same time.
- The branch describes what activities will take place based on a set of conditions.
- All branches at some point are followed by a merge to indicate the end of the conditional behavior started by that branch.
- After the merge all of the parallel activities must be combined by a join before transitioning into the final activity state.

How to Draw Activity diagrams



Activity diagrams - Notations



Activity states - Represent the performance of a step within the workflow.

Transition show what activity state follows after another.

Decisions (branch) for which a set of guard conditions are defined. These are conditions that must be met to trigger the transition.

Synchronization bars - which you can use to show parallel sub-flows. Synchronization bars allow you to show concurrent threads - fork or join.

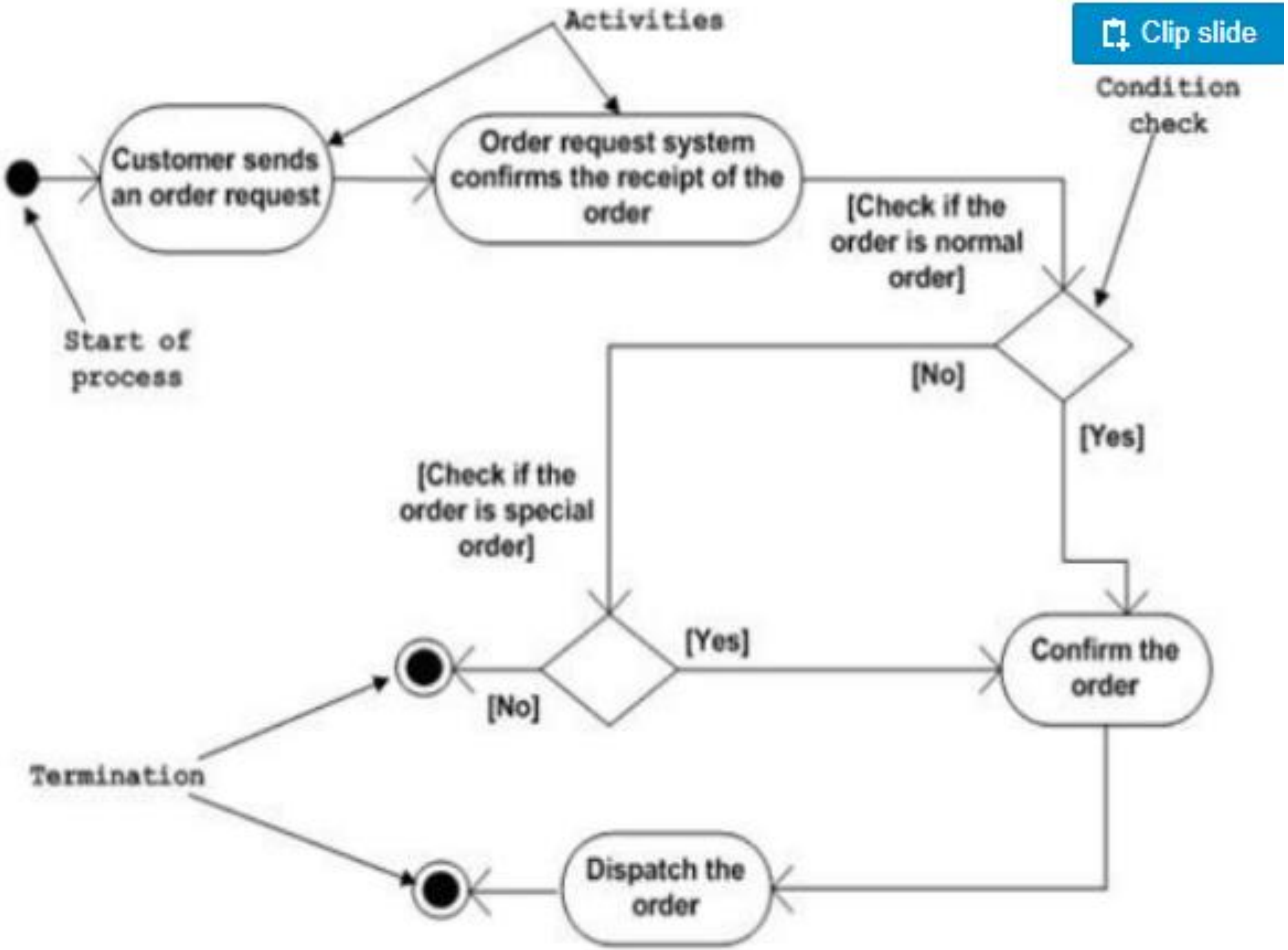
Activity Diagram

Draw activity diagram with the four main activities:

- Send order by the customer
- Receipt of the order
- Confirm order
- Dispatch order

After receiving the order request condition checks are performed to check if it is normal or special order.

After the type of order is identified dispatch activity is performed and that is marked as the termination of the process.


Activities
Condition check
Customer sends an order request
Order request system confirms the receipt of the order
[Check if the order is normal order]
Start of process
[No]
[Yes]
[Check if the order is special order]
[Yes]
[No]
Confirm the order
Termination
Dispatch the order

Interaction Diagrams

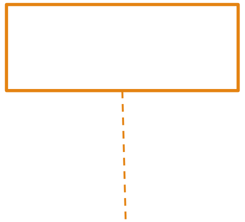
- Sequence Diagram
- Collaboration Diagram

Sequence diagrams

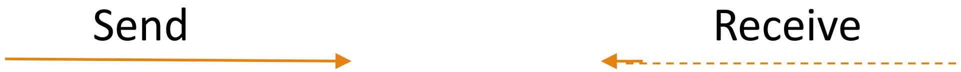
- Sequence diagrams describe interactions among objects in terms of an exchange of messages over time.
- Sequence diagrams show a detailed flow for a specific use case or even just part of a specific use case.
- The main purpose of a sequence diagram is to define event sequences that result in some desired outcome.
- The focus is on the order in which messages occur.

Elements of Sequence diagrams

- Life lines



- Messages



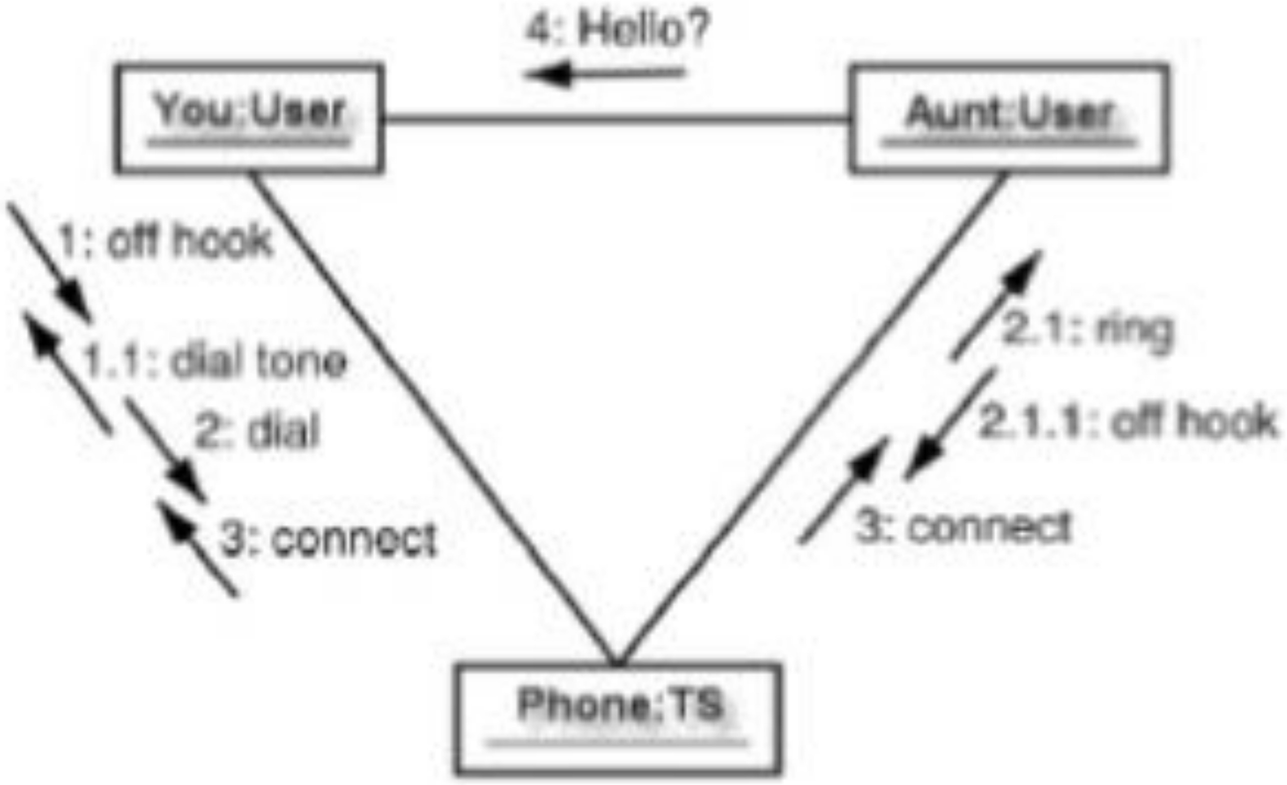
- Objects

Collaboration diagrams

- Dynamic behavior of objects can, in addition to sequence diagrams, also be represented by collaboration diagrams.
- The transformation from a sequence diagram into a collaboration diagram is a bi-directional function.
- The difference between sequence diagrams and collaboration diagrams is that collaboration diagrams emphasize more the structure than the sequence of interactions.
- Within sequence diagrams the order of interactions is established by vertical positioning whereas in collaboration diagrams the sequence is given by numbering the interactions.
- Its elements are:
  - – Object Links - solid lines between the objects that interact
  - – On the links are Messages - arrows with one or more message name that show the direction and names of the messages sent between objects

Collaboration diagrams

- Shows the relationship between objects and the order of messages passed between them.
- The objects are listed as rectangles and arrows indicate the messages being passed.
- The numbers next to the messages are called sequence numbers.
- convey the same information as sequence diagrams, but focus on object roles instead of the time sequence.


4: Hello?
You:User
Aunt:User
1: off hook
1.1: dial tone
2: dial
3: connect
2.1: ring
2.1.1: off hook
3: connect
Phone:TS