Tutorial 5: Process Modelling with Activity Diagrams

Activity Diagrams

These diagrams are typically used to model business processes (e.g. modeling the logic captured by a single use case or a workflow with several use cases). Activity diagram could be used to model internal logic of a complex operation. Basically they are useful in modelling any type of process.

They document:

- Initial node (start of workflow)
- Control flow (arrows indicating direction of workflow – may include branches)
- Activity (the things that happen during a workflow – may be manual or may computerised)
- Decision (actual test condition leading to different control flows)
- Guard condition (decisions that control branches)
- Merge (where different decision control flows (re)join)
- Fork (splits behaviour into parallel control flows)
- Join (bring back a set of parallel control flows)
- Event (something that triggers further activities, or transitions from one activity to another)
- Final (activity) node (can be more than one)

Requirements and Activities

Any requirements that describe a workflow can be drawn as an activity diagram. The following requirements describe a workflow to add a new feature to the ArtSpace system. For example, a member (who may be an artist, a dealer) might wish to introduce a new type of charity auction to the system that has different pricing and payment regulations to the existing auction type:

1. The member prepares a ‘new feature’ proposal for submission to the management group of ‘ArtSpace’.
2. The management group meets monthly.
3. The management group may accept the proposal, reject it, or request that it be resubmitted with amendments.
4. An accepted proposal is forwarded to the software development team, which decides how, or if, the new feature can be added to the system.
5. The software development team meets to discuss new requirements on a weekly basis.
6. The software development team may agree to implement the proposed new feature or may refer it back (with comments on technical, financial or other issues) to the management group for amendments and resolution.

7. The management group may resubmit and amend a feature proposal independently, return it to the originating member for revision and resubmission, or withdraw the proposal.
8. Once the new feature is approved, the project manager adds the introduction of the feature to the software development team's schedule.
9. The software development team build the feature into the system.
10. The new feature is made available for appropriate members to use.

Turning Requirements into an Activity Diagram

- Identify the main activities
- Put them in order
- Think about where the workflow begins, and the various places it might end
- Consider where any branches in the workflow might occur and what the guard conditions are
- If there are branches, do the control flows merge again? Or terminate?
- Consider if there are any important events.

Tutorial Exercise

1. Using the requirements stated above, create an activity diagram that describes the 'Add new auction type' workflow.
2. Redraw your activity diagram so that it includes swim-lanes to show the different actors.
3. Identify activities that you think should be modelled as system use cases, and those that you think could remain manual processes.

Tutorial Questions

Prepare your answers for the following questions for discussion at Tutorial 5.

1. What is a workflow?
2. Why might an activity diagram include 'fork' and 'join' notation?
3. What criteria would you apply to deciding if an activity should be a system use case?
4. Why might your activity diagram need swim-lane(s)?

Tutorial 5A – Process Modelling with BPMN

Task

Considering the three properties for a *sound* process model, identify potential violations of those properties in the process model below.