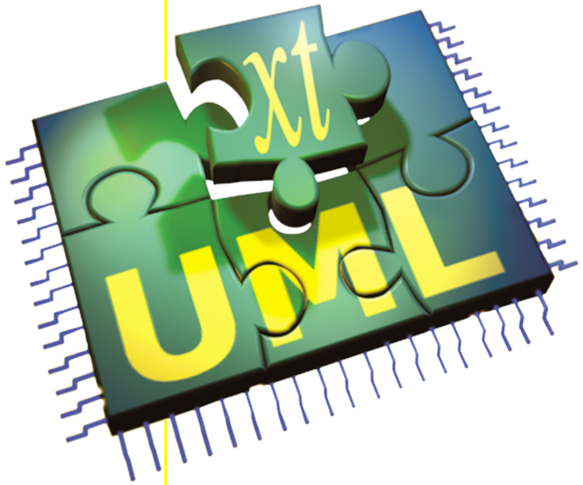
Analysis – Step 1 in the xtUML Method

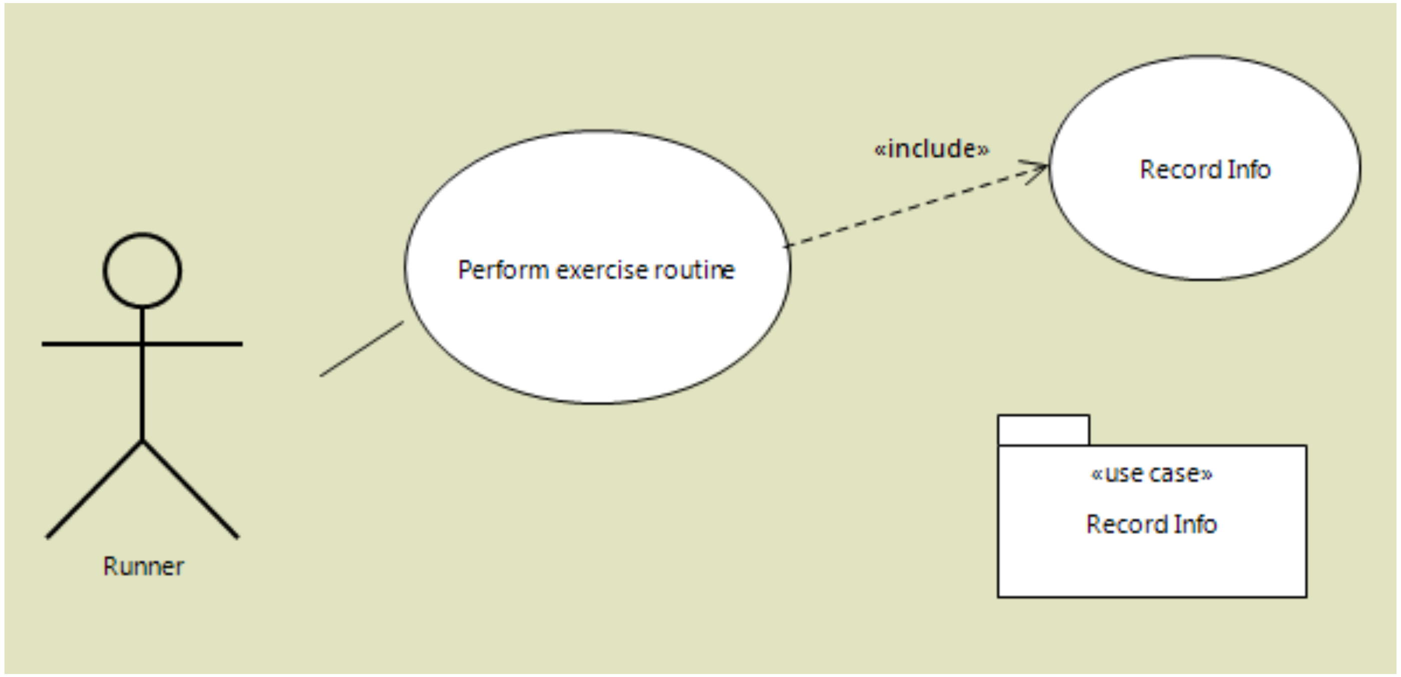
- **Analysis** – questioning, thinking, sketching...
  - Descriptive UML diagrams
    - use case, sequence, ...
- **Executable Modeling** – formalizing the analysis:
  - Component Diagrams (partitioning/interfaces)
  - Class Diagrams (data)
  - State Machines (control)
  - Activities (processing)
- **Verification**
  - Interpretive Model Execution
- **Code generation**
  - Template and Rule-Based Translation



BridgePoint™

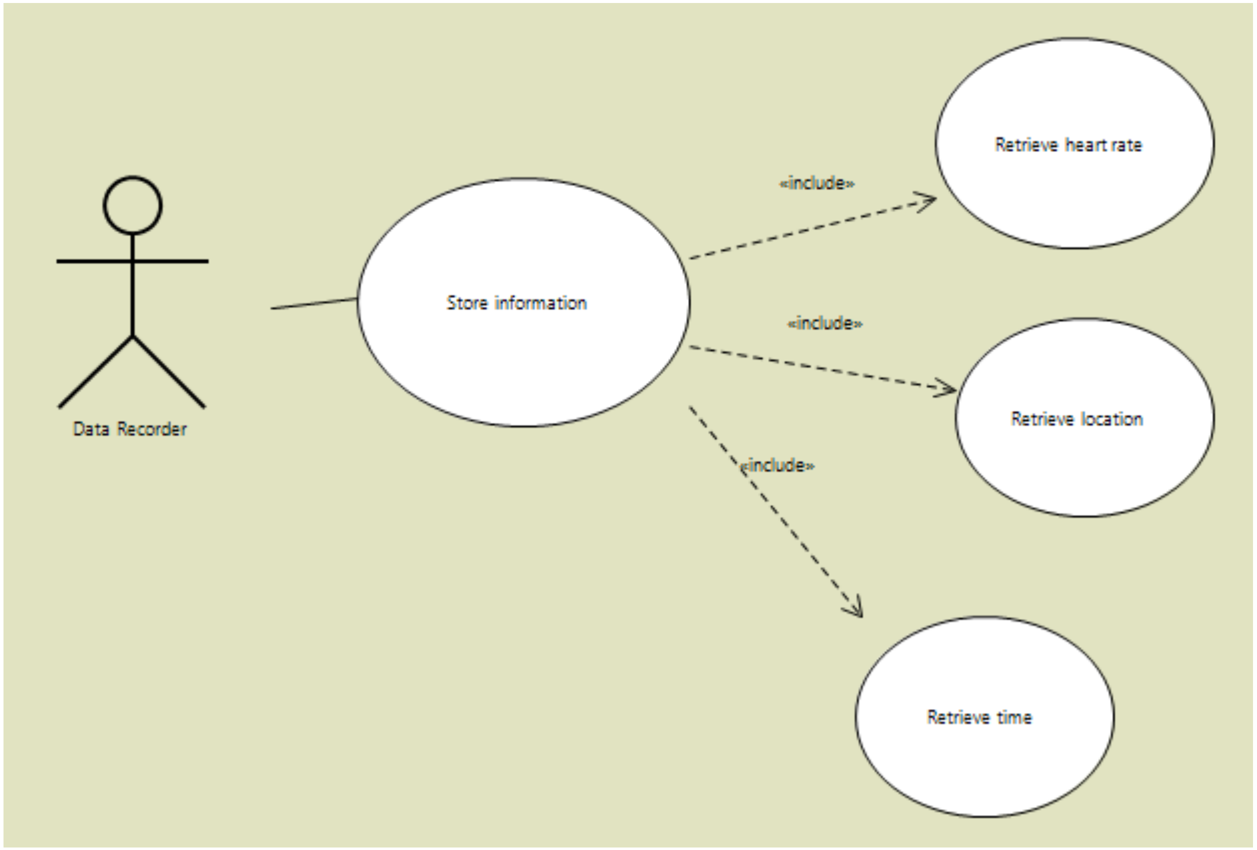
Use Cases

- A use case is a description of a potential series of interactions a software module and an external agent which leads to something useful. (usage case)



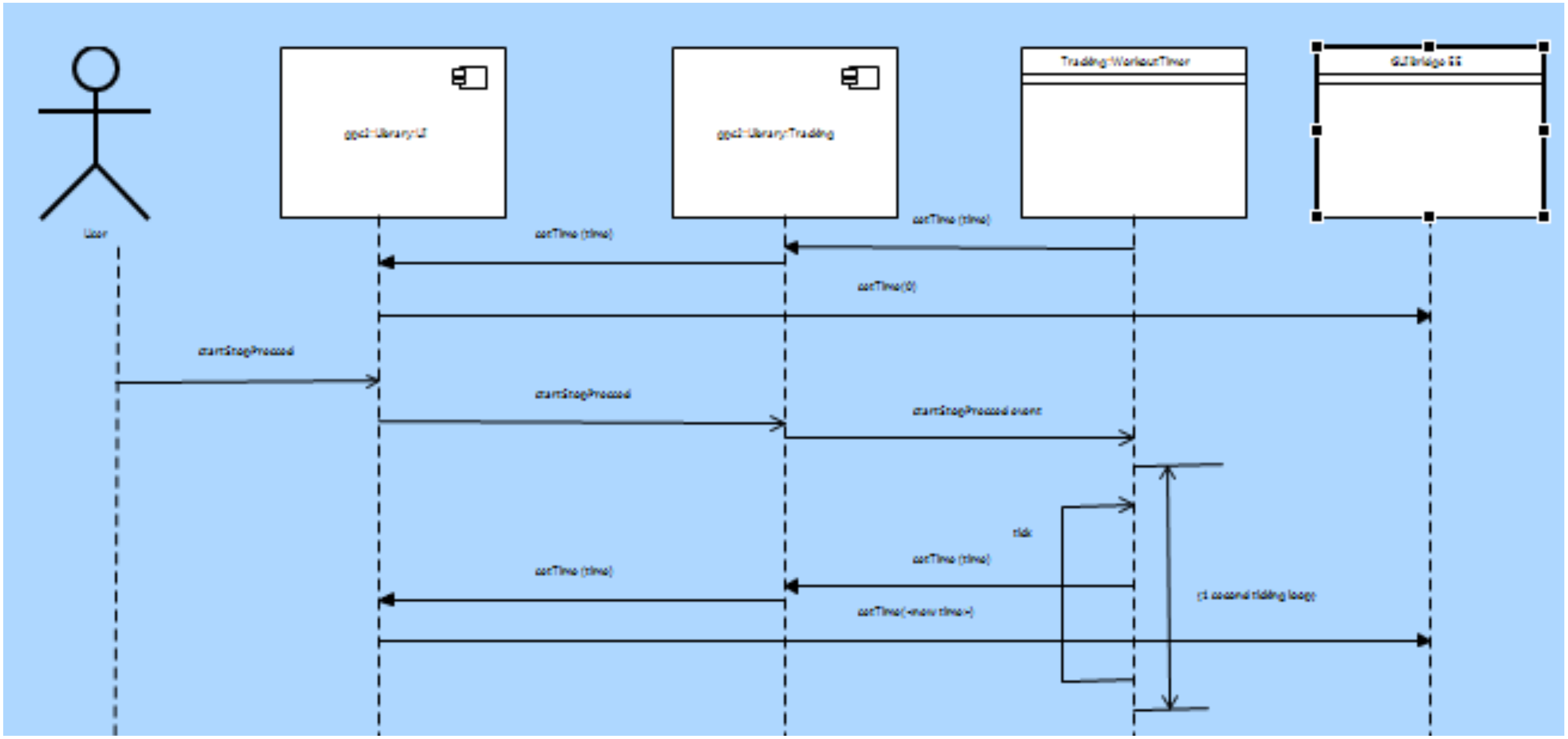
Use Case Diagramming

- This use case illustrates a hierarchy of usage within a use case showing hierarchy of usage and interaction.



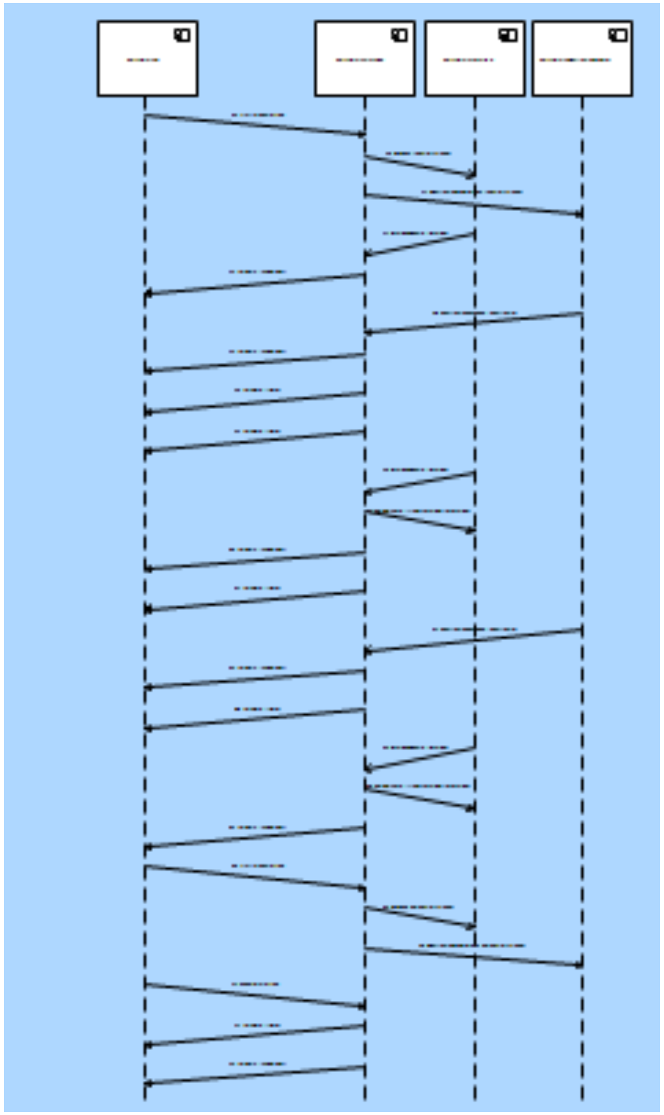
Sequence Diagrams

- A sequence diagram is a type of interaction diagram that shows how processes operate with one another and in what order. Sequence is actually short for “Message Sequence”.



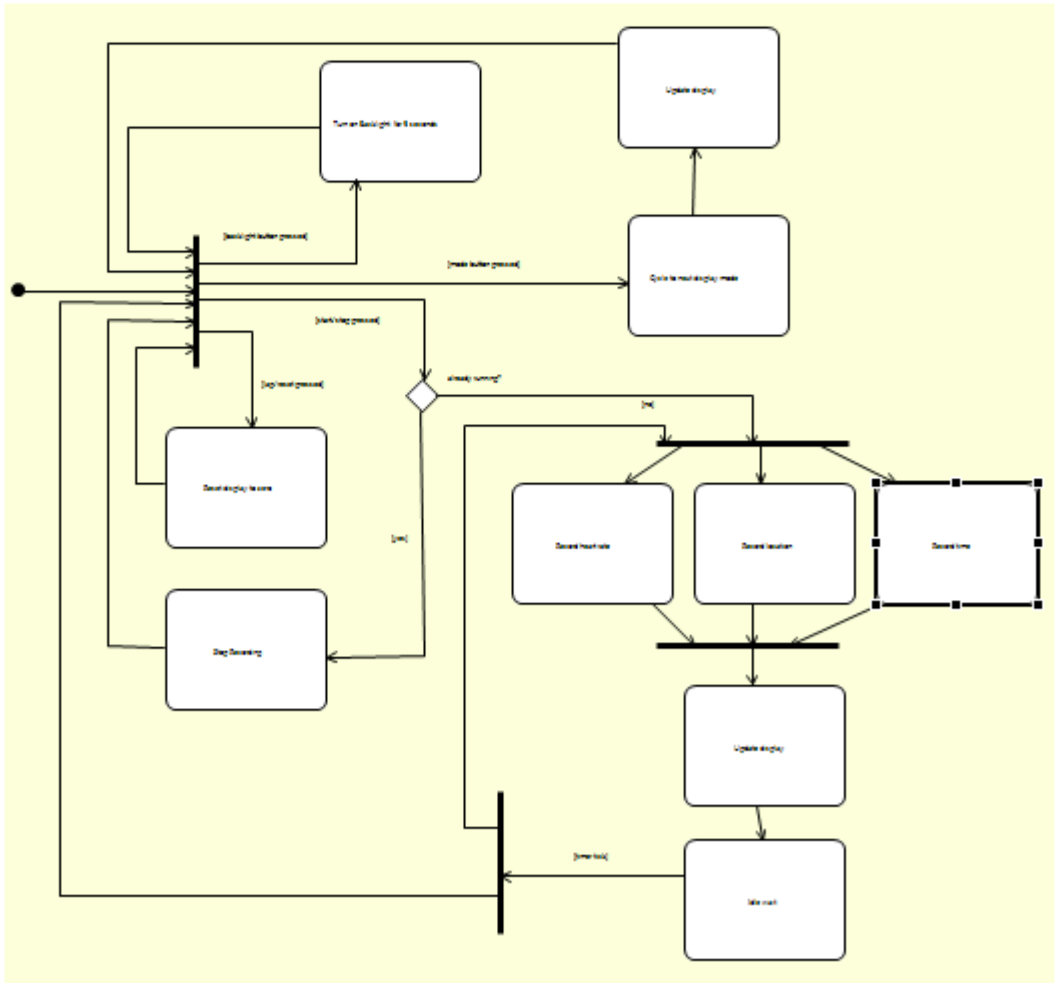
Sequence Diagrams

- Sequence diagrams can show expectations or actual resulting behavior. Here is an example of a sequence chart generated from a run.



Activity Diagrams

- Activity Diagrams show the flow of processing.
- They can show “large” flows at a “high level”.
- Or they can show the inner workings of low level state actions, transitions, operations, etc.

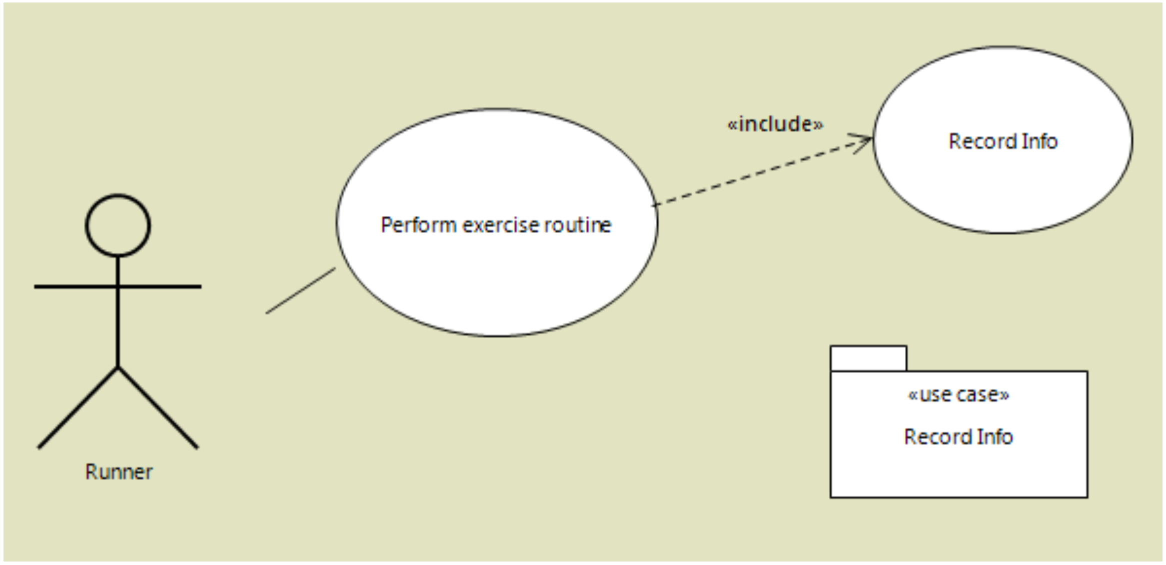


Mapping Into System Solution Model

- Artifacts from analysis models supply clues to artifacts needed in the working solution.
- A mapping can exist from an element or elements on an informal analysis model to the executing solution model.
- This mapping is not necessarily one-to-one.
- This mapping is not necessarily isomorphic.

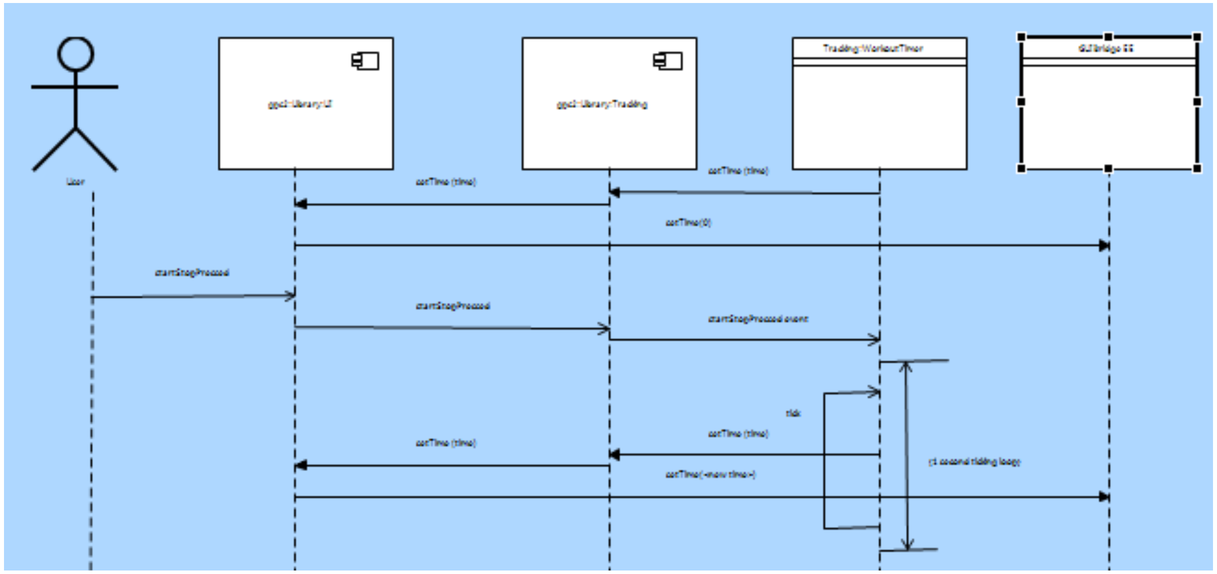
Use Case Mapping

- **Actors → class, messages from other components**
- **Use case → class state machine, state, cluster of states and state machines**
- **Associations → associations on class diagram**



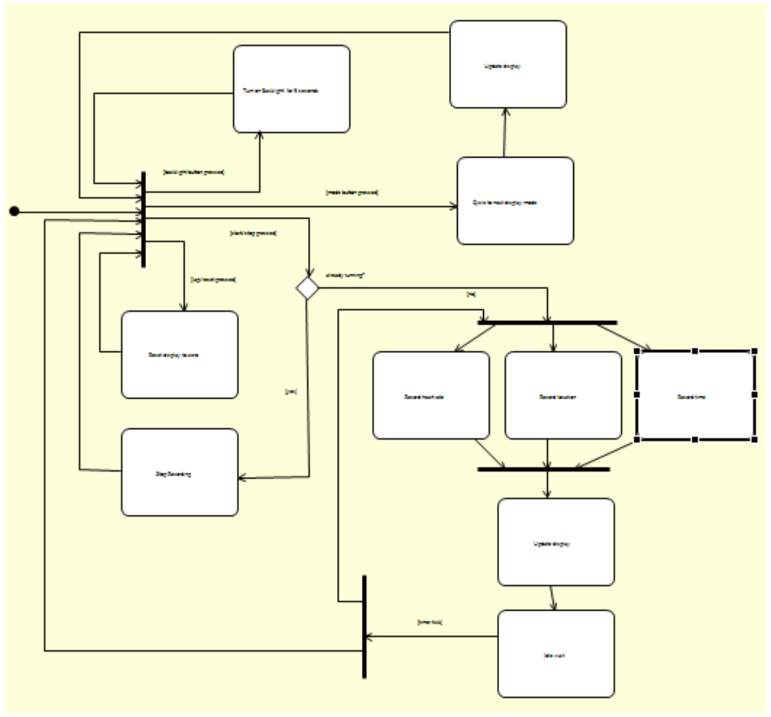
Sequence Diagram Mapping

- Component → component, class
- Message → message, event, instance
- Instance → instance, message, component
- Ordering → state machine or thread of control sequence



Activity Diagram Mapping

- Partition → class or component
- Action → state action, transition action, operation, function, etc.
- Action → single line of OAL
- Fork/join → concurrency in state actions or messages
- Events/signals → events/signals
- Decision → if statement, multiple transitions
- Initial node → creation state
- Final node → final state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Reset display to zero
Record heart rate
Record location
Record time
Update display