cs121 - software development
UML

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outline

what is uml?
goals
short history
diagram types

use case diagram
state diagram
activity diagram
what is uml?

uml = unified modeling language

a language for specifying, visualizing, constructing, and documenting the artifacts of software systems

standard sanctioned by the object management group

www.omg.org

initial 1997, revised 2003
goals of uml

Provide users with a ready-to-use, expressive visual modeling language
Provide extensibility and specialization mechanisms to extend the core concepts
Be independent of particular programming languages and development processes
Provide a formal basis for understanding the modeling language
Encourage the growth of the OO tools market
Support higher-level development concepts such as collaborations, frameworks, patterns and components
Integrate best practices
short history of uml

grady booch, jim rumbaugh and ivar jacobson
then at rational software
object oriented software engineering

standardization via OMG
with input from many...
uml diagram types

use case diagram
state diagram
activity diagram

class diagram
interaction diagrams (objects)
  sequence diagram
  collaboration diagram

physical diagrams
  component diagram
  deployment diagram
use case diagram

displays the relationship among actors and use cases (static)
use to gather and explore requirements for purpose of design or testing

involves actors and use cases relationships
actor / use case
use case / use case: extends, includes, generalizes

system actor use case title
use case diagram: example1

<<player>>

Play Platform Defense

- Login
- Select role
  - Play platformer
  - Play builder
- Play game
use case diagram: example2

- <<player>>
- Play Platformer Level
  - Start platformer level
  - Progress through path
  - Win level
  - Defeat Boss

<<includes>>
state diagram

displays the sequences of states that an object goes through during its life in response to received stimuli, together with its responses and actions (dynamic)

start / end states

transition

+ event / message

state

state name
state diagram: example1
tower

- under construction/repair
  - guarding
    - shooting
    - destroyed
state diagram: example2
tower
activity diagram

special state diagram where most of the states are action states and most of the transitions are triggered by completion of the actions in the source states focuses on flows driven by internal processing (dynamic)

start / end of flow

transition

activity

synchronization

activity name
activity diagram: example
play platform defense

connect to server

enter name
select role

play game
summary

uml is a unified language
   all that (so many diagram types!)
   and only that...

language does not magically solve all problems!

use diagrams when they help in design and
   requirements modeling, code design, etc.

class diagram and interaction diagrams will be described
   when relevant...