

CS445 / ECE451 / CS645 / SE463
Software Requirements Specification & Analysis
Navigation Diagrams

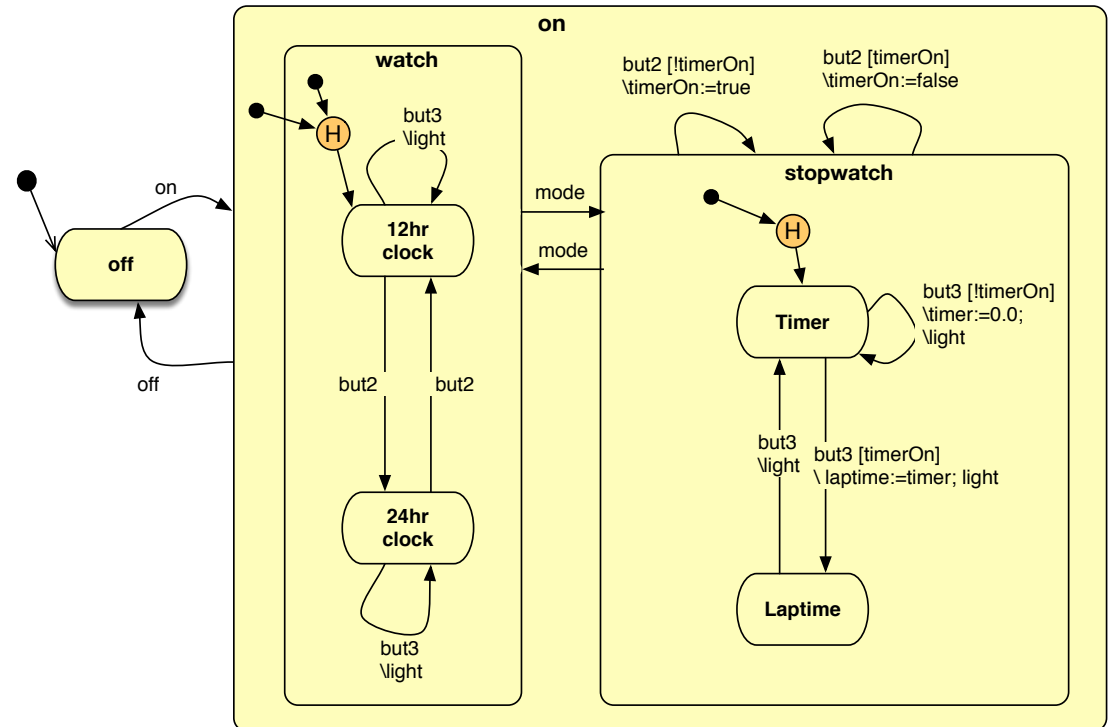


Navigation Diagrams

A state-machine model can serve as an executable navigation diagram

Inputs: Transitions are triggered by input events
GUI events, or events on
<<interface>> phenomena

Outputs: UI screen shots are displayed as state or transition actions.



GUI EventsReadYourStory

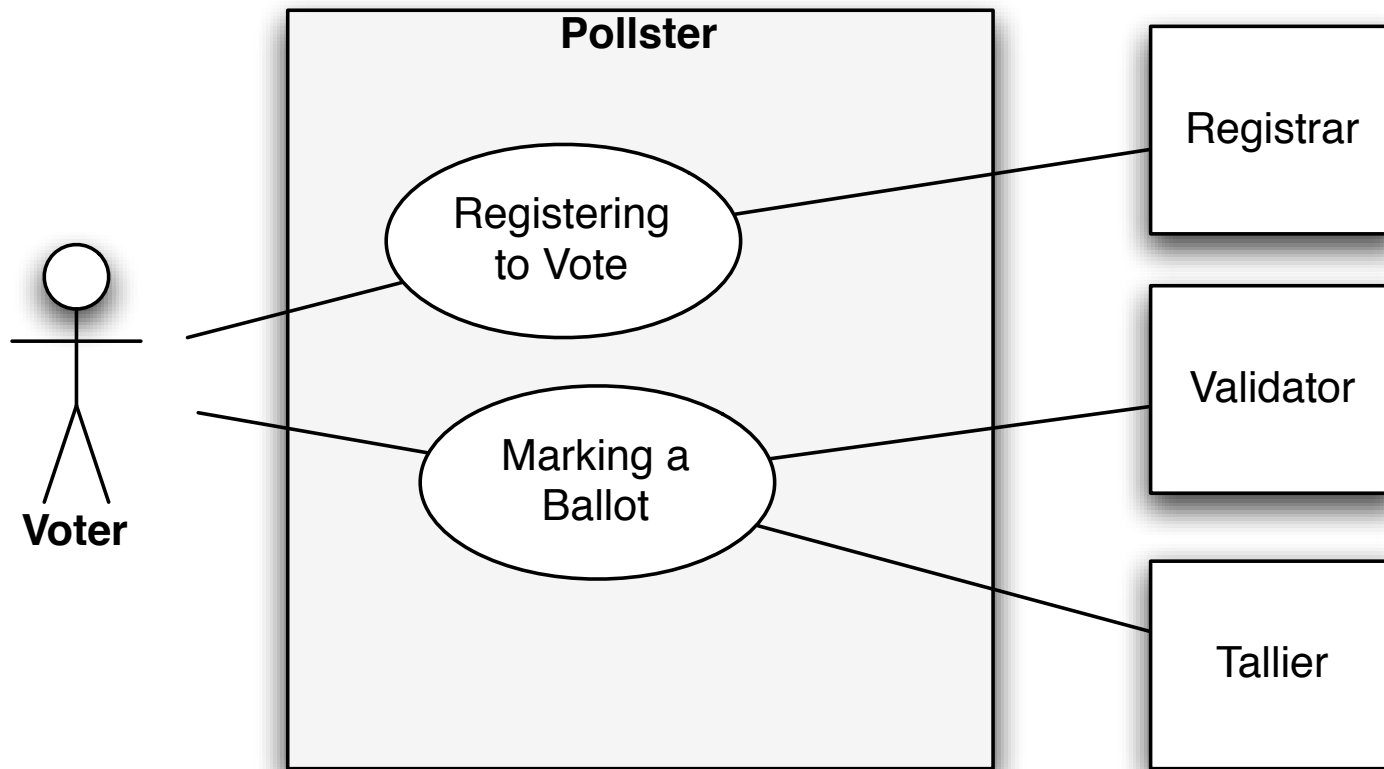
- **cancel()** - User cancels the book ordering/checkout process by either navigating to the home page before adding to cart or by clicking the back button on the browser when checking out.
- **clickHome()** - User clicks "Read Your Story" text on the middle of the navigation bar on the top of the page or the logo above the text (for screens 1-8)
- **clickCart()** - User clicks "CART" link on the right end of the navigation bar on the top of the page (for screens 1-8)
- **clickCreate(bookId)** - User clicks on "Create Your Book" button for a specific book (for screen 1 or 7)
- **clickBookTitle(bookId)** - User clicks on the books title or image (for screen 1)
- **clickUpload()** - User clicks "UPLOAD A PHOTO" button (for screen 2)
- **clickUploadLater()** - User clicks "OR UPLOAD A PHOTO LATER" button (for screen 2)
- **clickReupload()** - User clicks "USE A DIFFERENT PHOTO" button (for screen 3)
- **clickPreview()** - User clicks "PREVIEW YOUR BOOK!" button (for screen 3)
- **editDetails()** - User clicks "EDIT DETAILS OR PHOTO" button (for screens 4,5, and 8)
- **updatePage(nextPage)** - User clicks either left or right arrows keys located on the preview page (for screens 4,5, and 8)
- **addToCart(order)** - User clicks "ADD TO CART" button (for screens 4,5, and 8)

Example: Electronic Voting

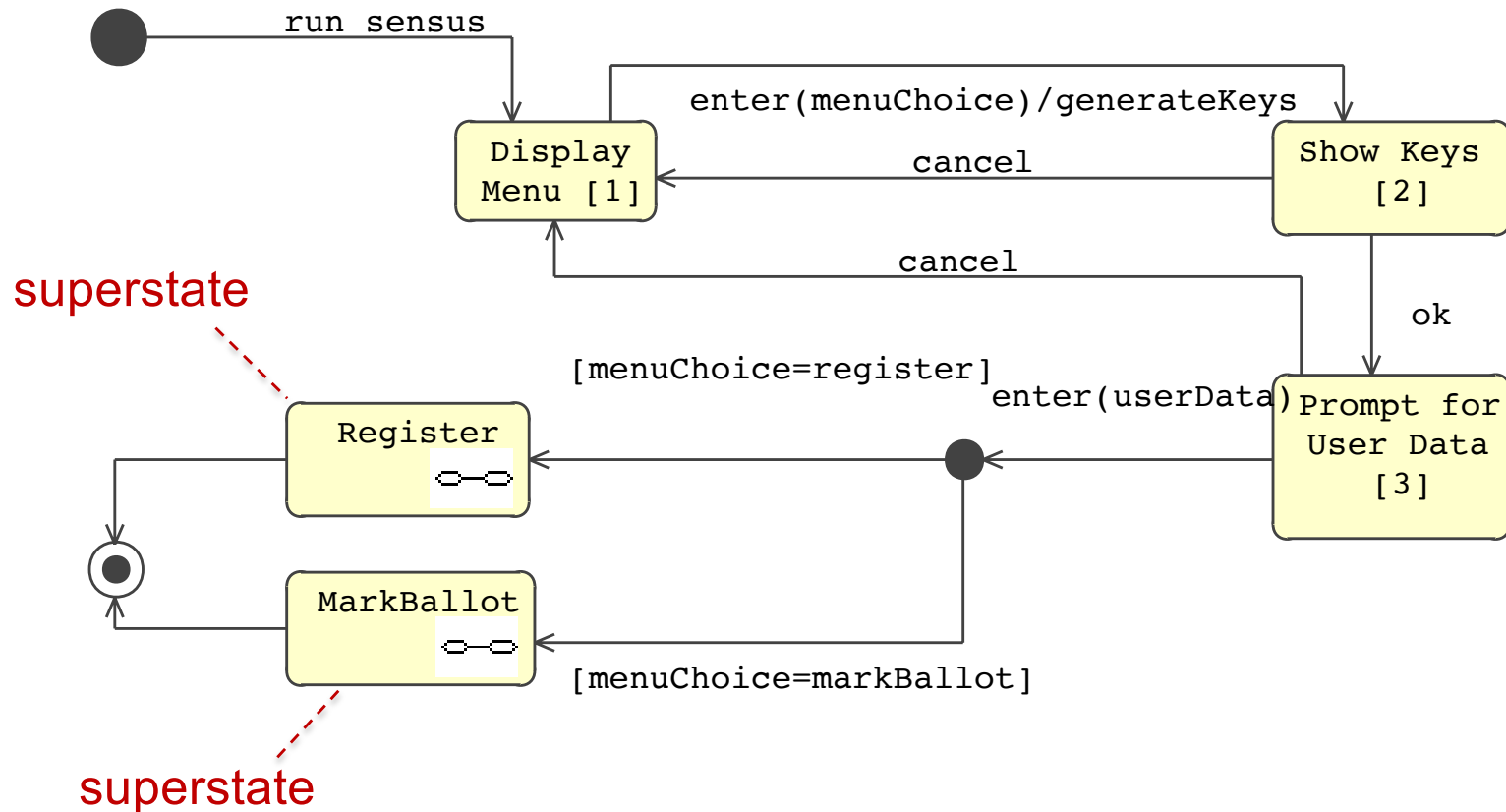
- **Registrar**: registers voters prior to an election.
- **Validator**: ensures that only registered voters can vote, and that only one ballot is counted for each registered voter.
- **Tallier**: tallies the results of the election or survey.
- **Pollster**: acts as a voter's agent, assisting with voter registration, presenting human-readable ballots to a voter, collecting the voter's responses to ballot questions, performing cryptographic functions on the voter's behalf, obtaining necessary validations and receipts, and delivering ballots to the ballot box.

Lorrie Faith Cranor, Ron Cytron: "Sensus: A Security-Conscious Electronic Polling System for the Internet." in *HICSS*, 1997.

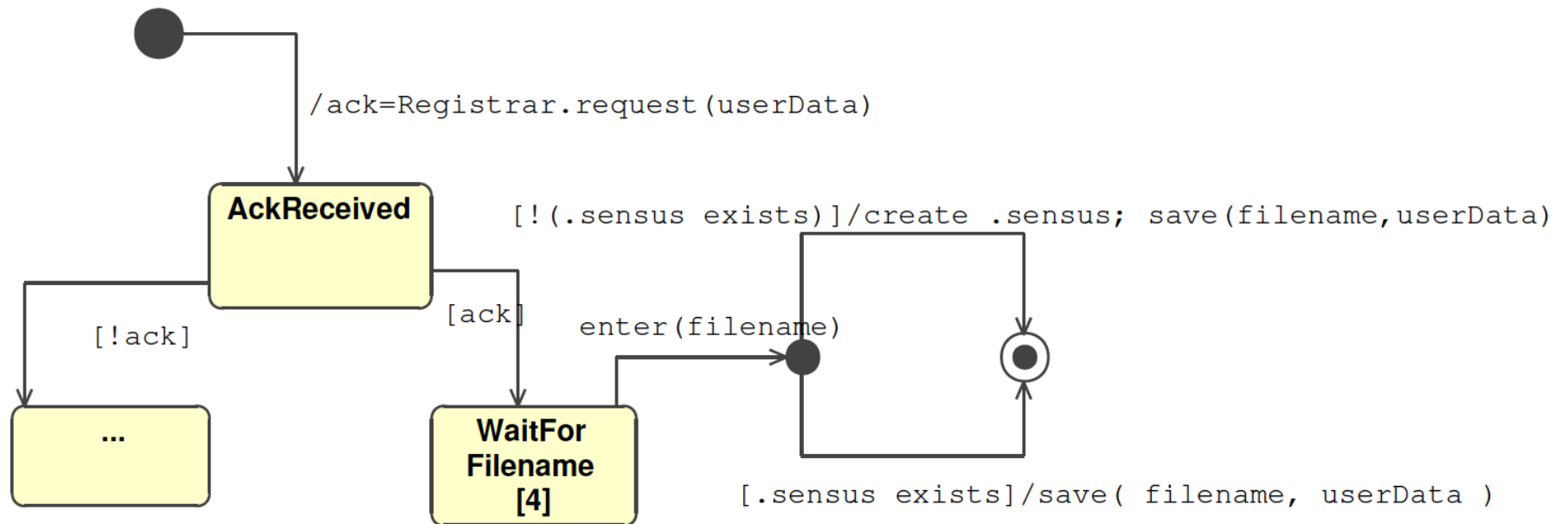
Use Cases



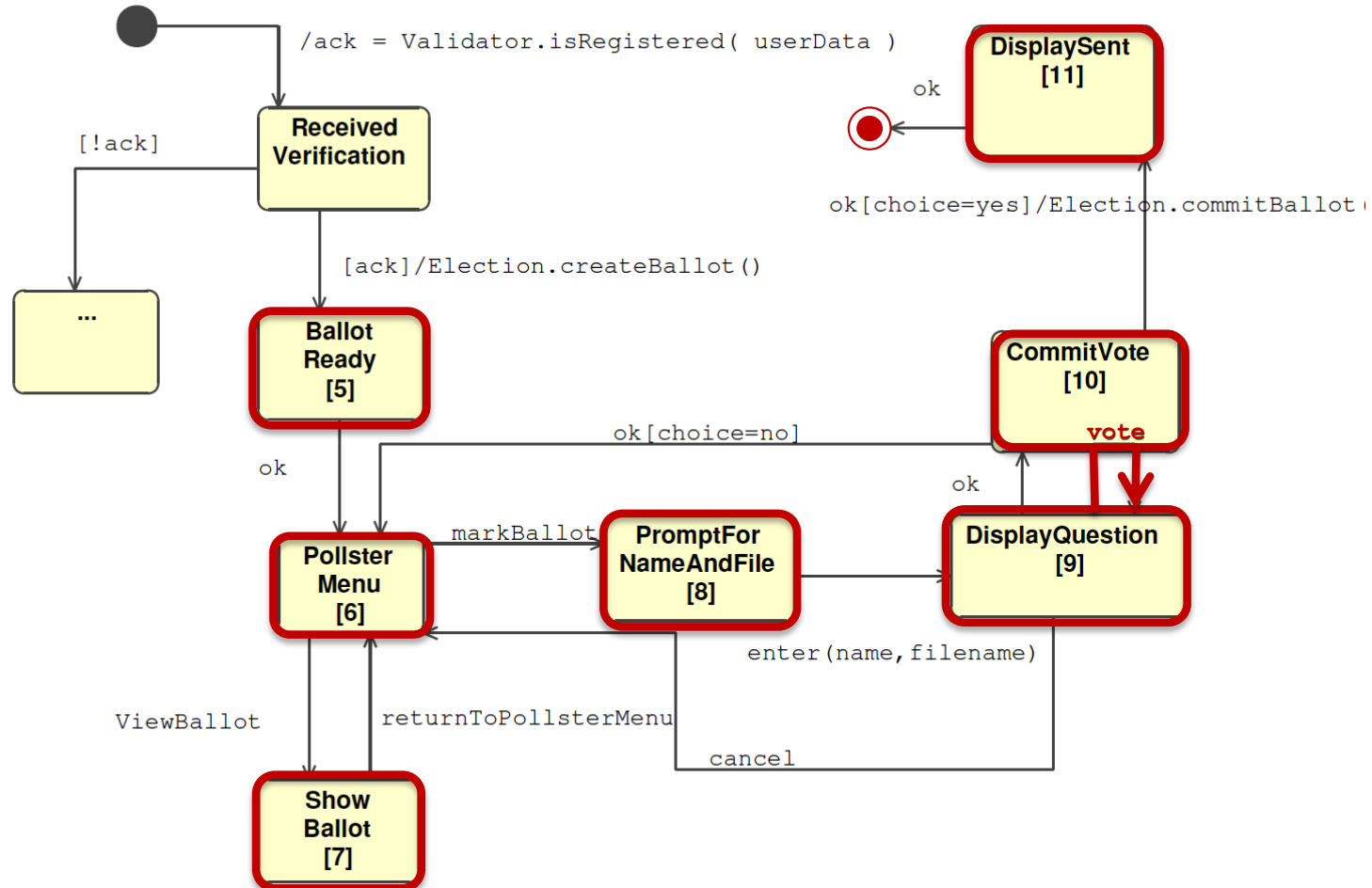
Navigation Diagram



“Register” Navigation Diagram



“Mark Ballot” Navigation Diagram



UC “Registering to Vote”

Precondition: The voter has obtained a voter [ID, token, and registration address] from election administrators.

Voter «actor»	Pollster	Registrar «actor»
<p>1. Voter <i>invokes the sensus command</i>, to run the Pollster.</p> <p>3. Voter <i>selects the option</i> “register to vote”.</p> <p>5. Voter <i>hits “ok” button</i>.</p>	<p>2. Pollster displays a menu with options “register to vote” and “mark ballot”. 1</p> <p>4. Pollster generates and shows a public/private key pair for Voter. 2</p> <p>6. Pollster prompts voter for his/her [identification number, token, and registration address]. 3</p>	

UC “Registering to Vote”

Voter «actor»	Pollster	Registrar «actor»
<p>7. Voter types his/her [identification number, token, and registration address].</p> <p>8. Voter hits “ok” button.</p> <p>13. Voter types in a filename he/she will remember to Pollster; this name must be unique for the registration authority.</p>	<p>9. Pollster prepares registration request on Voter’s behalf.</p> <p>10. Pollster submits registration request to registrar.</p> <p>12. Pollster prompts Voter for a file name for saving his/her registration information. 4</p>	<p>11. Registrar sends acknowledgement to Pollster within a few seconds.</p>

GUI (In)Dependent Diagrams

Sensus

GUI-dependent: diagrams annotated with **GUI** events

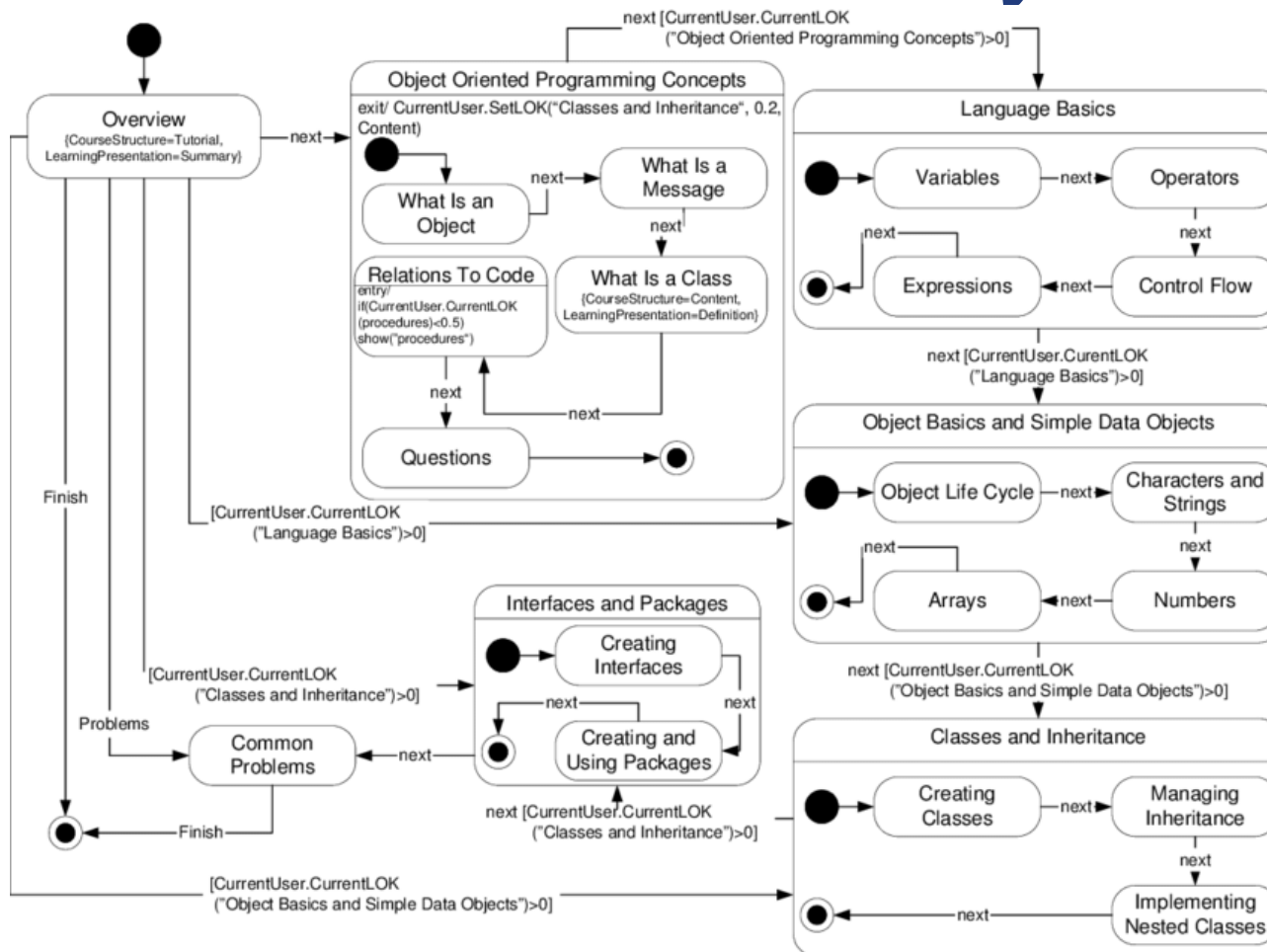
- GUI events (e.g., button pressed) to trigger behaviour
- GUI actions (e.g., Display “OK”) as system reactions

watch

GUI-independent: diagrams annotated with **macro** events and actions, which map indirectly to GUI events

- Declare macros for GUI events (e.g., button pressed)
- Declare macros for GUI actions (e.g., Display “OK”)
- Annotate models with macros

Summary



Navigation Diagram for a Java tutorial in

Ceri et al. "Adding client-side adaptation to the conceptual design of e-learning web applications" in *Journal of Web Engineering*, vol 4, no 1, 2005.

References

Craig Larman, *Applying UML and Patterns, 3ed.*, Prentice Hall, 2004.

- Chapter 23: “UML State Machine Diagrams and Modeling”

Lenny Delligatti, *SysML Distilled: A Brief Guide to the Systems Modeling Language*, Addison-Wesley Professional, 2013.

- Chapter 8: “State Machine Diagrams”



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Screens

Wireframes of the screens follow this slide.

Menu of Options

1

Select one option:

- Register to vote
- Mark ballot

Registration Prompt 3

Please enter your

Voter identification no.


Voter token

Registration address

File Name Prompt

4

Please enter a file name for saving your registration information.



OK CANCEL

Send Unvoted Ballot 5

Your pollster has just been sent an unvoted ballot.

You may now choose to mark your ballot.

OK

CANCEL

Pollster Menu

6

Select one command:

- View ballot questions and instructions
- Mark ballot

View Ballot

7

Issue/Question/Office 1

Choice 1

Choice 2

⋮ ...

Choice j

Issue/Question/Office 2

Choice 1

↑

↓

⋮

Name Ballot

8

Please enter the name of the ballot for which you wish to vote.

Please enter the name of your registration file, found in your .sensus directory.

OK

CANCEL

Display Ballot Question

9

Issue/Question/Office 1

Choice 1

Choice 2

•••

Choice j

Vote for only 1 choice

Issue/Question/Office 2

Choice 1

•
•
•

Vote Ending Question

10

Vote ending question i

Yes

No

Choose
exactly 1
choice

OK

CANCEL

Voted Ballot Sent

11

Your voted ballot has been sent to
the election authority.

Answering OK will exit sensus.

OK

CANCEL