

Unified Modeling Language (UML)

Andy Podgurski

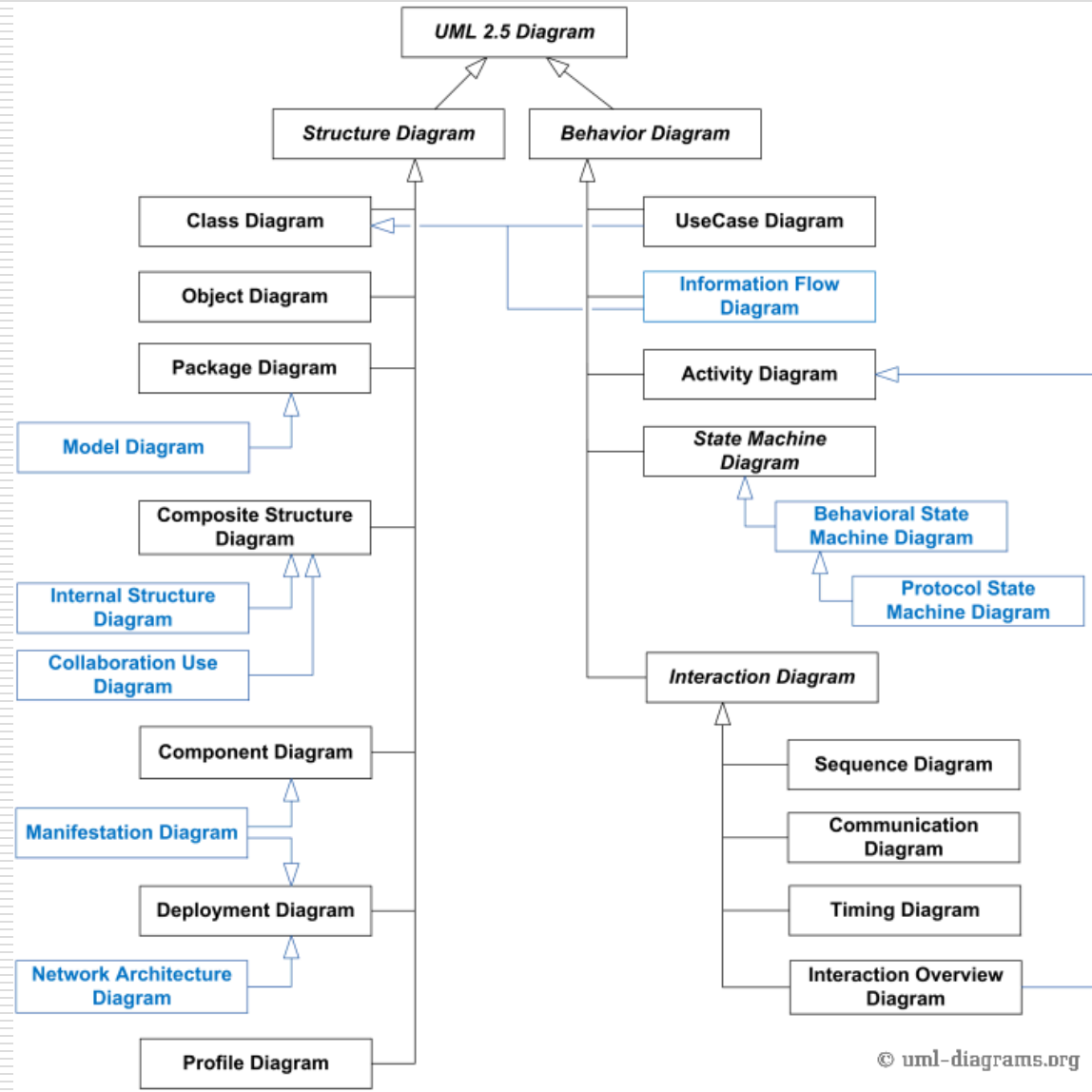
EECS Dept.

Case Western Reserve University

Introduction

- ❑ UML is a collection of *diagrams* for use in:
 - Modeling *business processes* and other processes
 - *Analysis, design, and implementation* of software-based systems
 - ❑ Each describes a different aspect of an application's *static structure* or *dynamic behavior*
 - ❑ We'll consider a subset of these diagrams
-

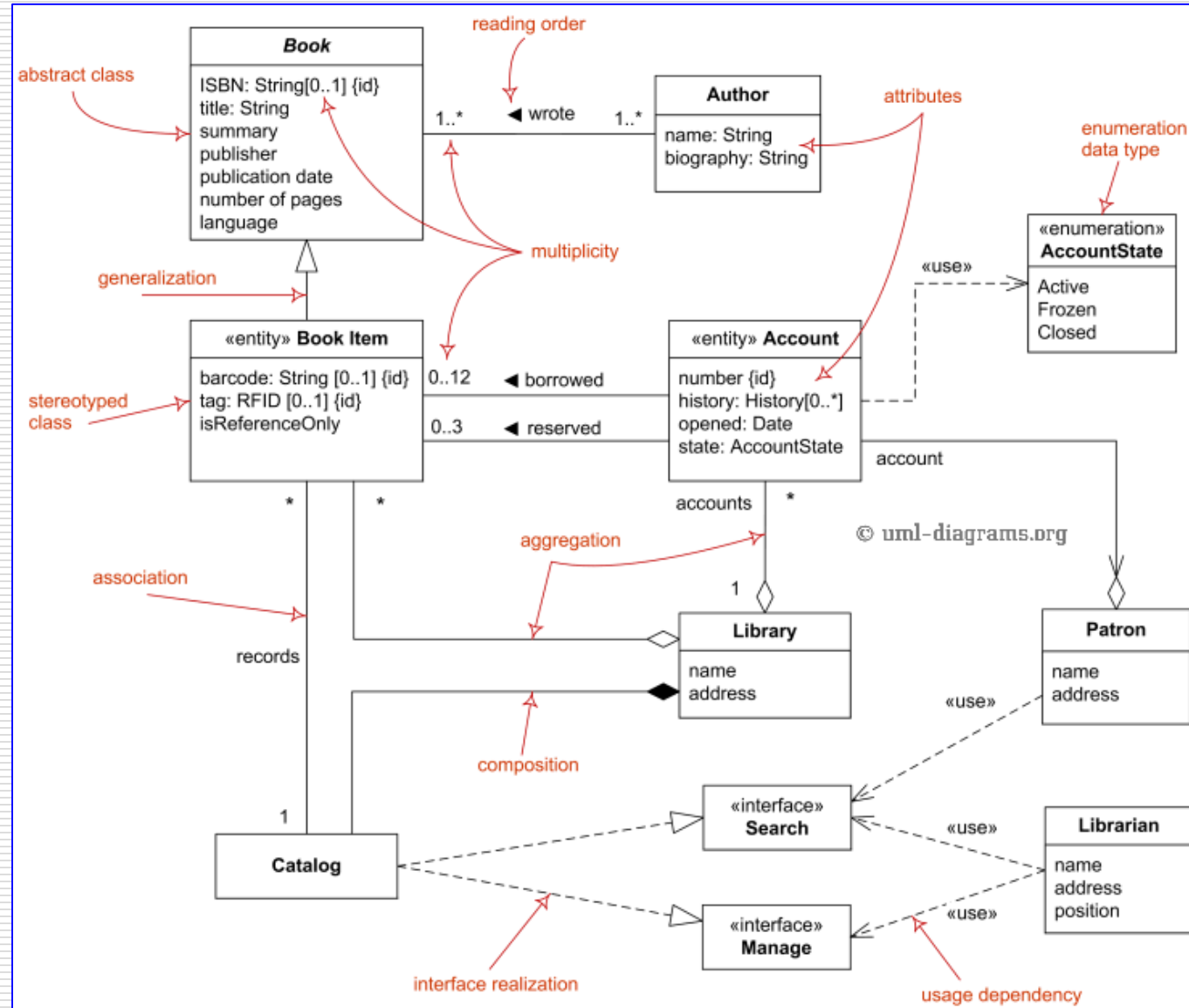
Taxonomy of UML Diagrams



Class Diagrams

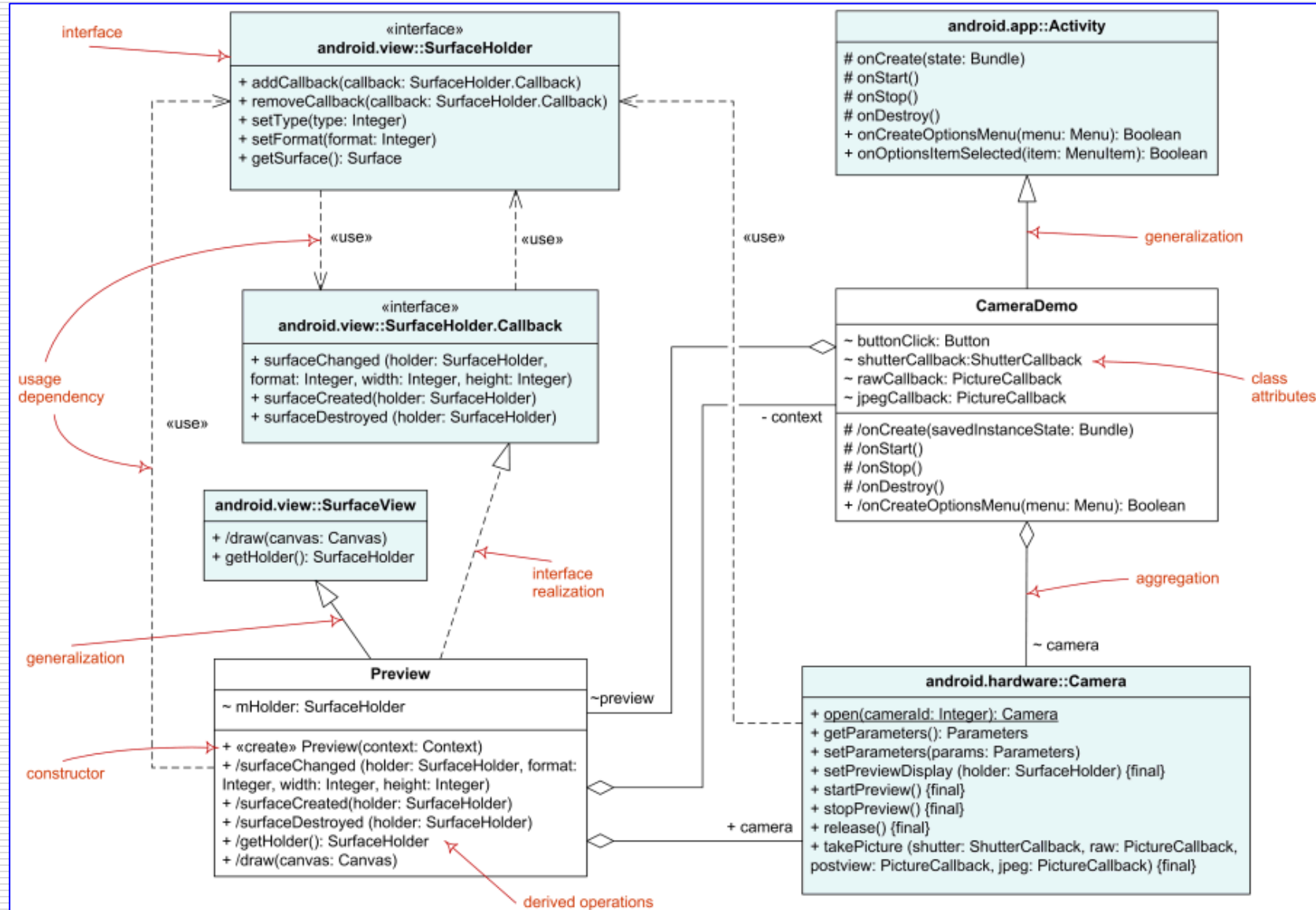
- Shows *structure* of the designed system, subsystem or component as *related classes and interfaces*, with their
 - *Attributes and operations*
 - *Constraints*
 - *Relationships*
 - *Associations, generalizations, dependencies*, etc.
-

Example Domain Model Diagram



Example Diagram of Implementation Classes

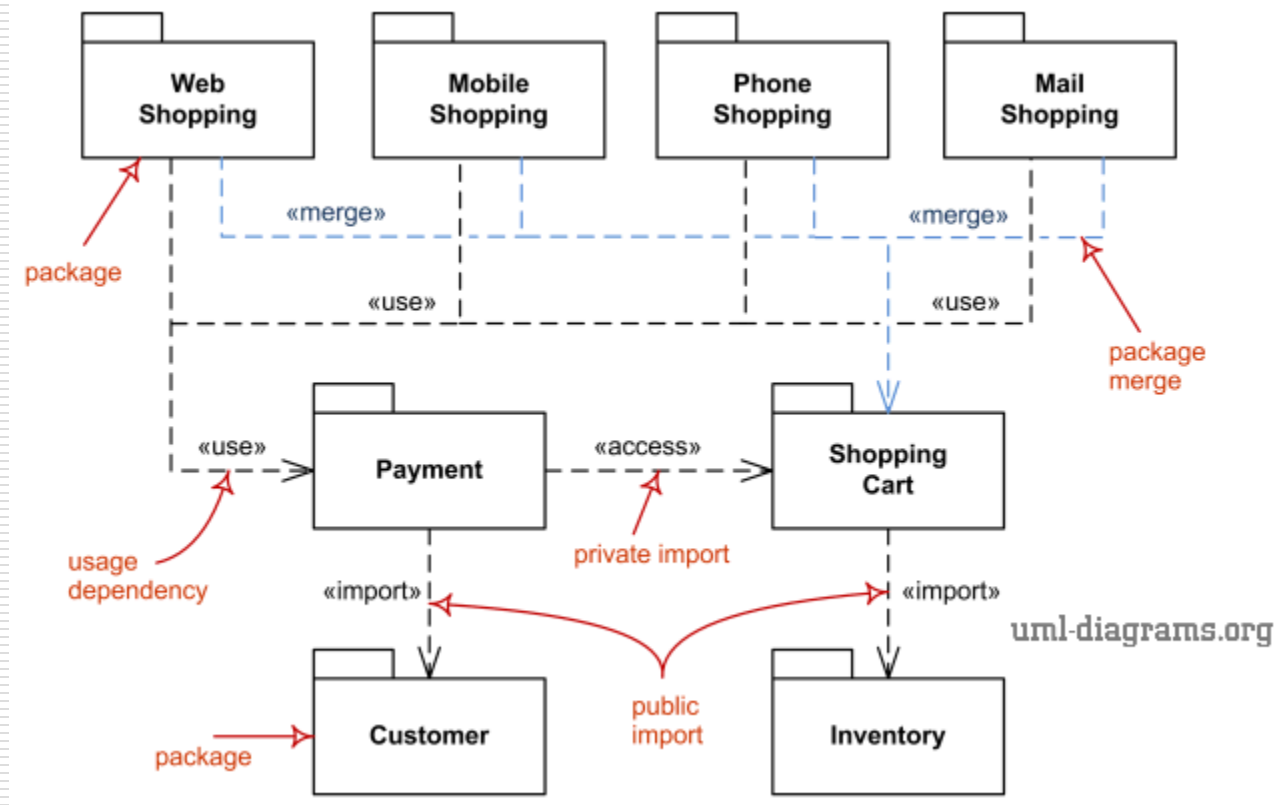
- Private
Protected
+ Public



Package Diagram

- ❑ Shows structure of designed system at level of *packages* of related elements
 - ❑ A package is a *namespace*
 - ❑ A package can *import* other packages
 - Adds names of members of imported package to its own namespace
-

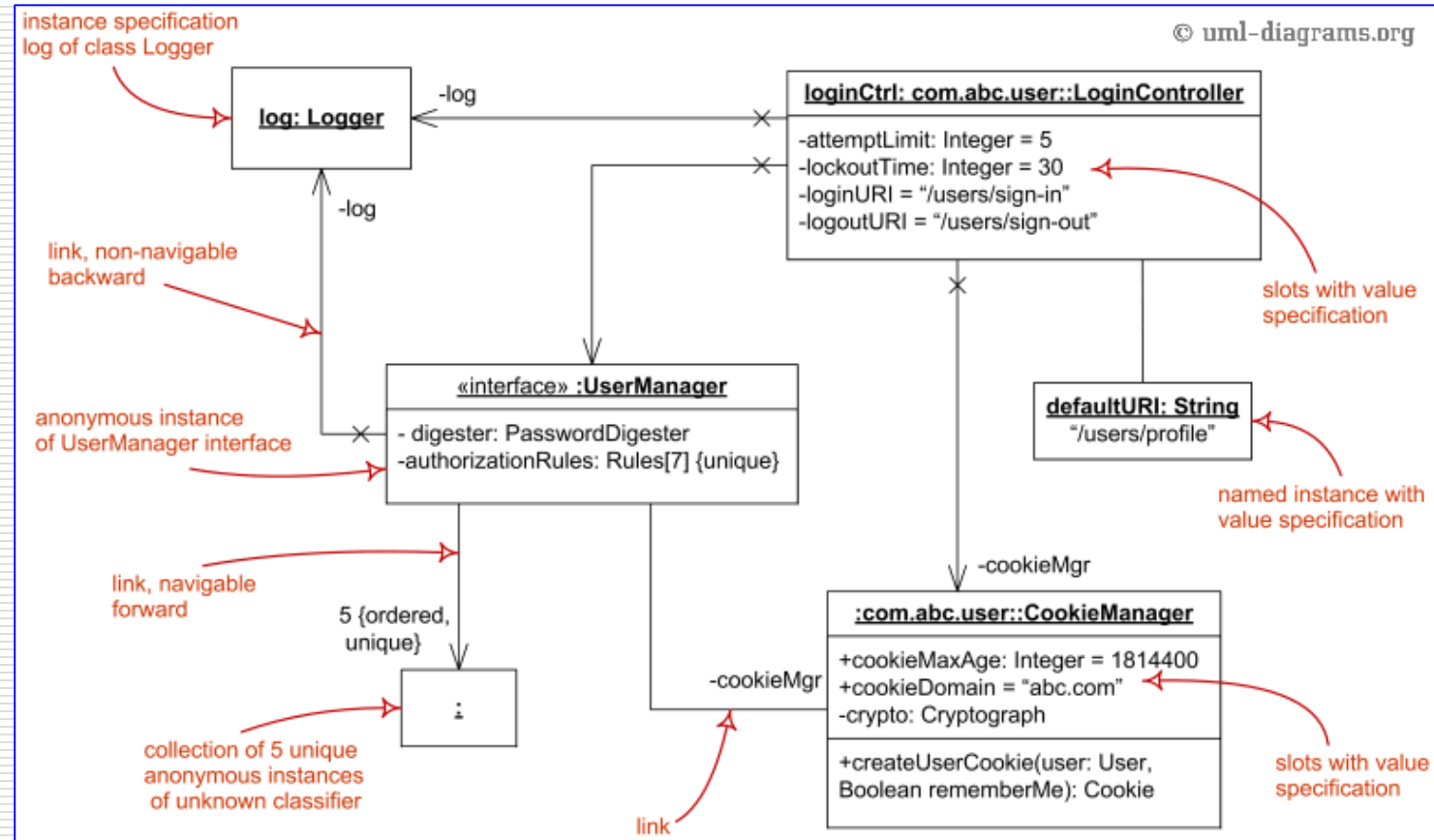
Example Package Diagram



Object Diagrams

- ❑ Depict objects and their relationships at a point in time
 - ❑ Essentially an “instance” of a class diagram
-

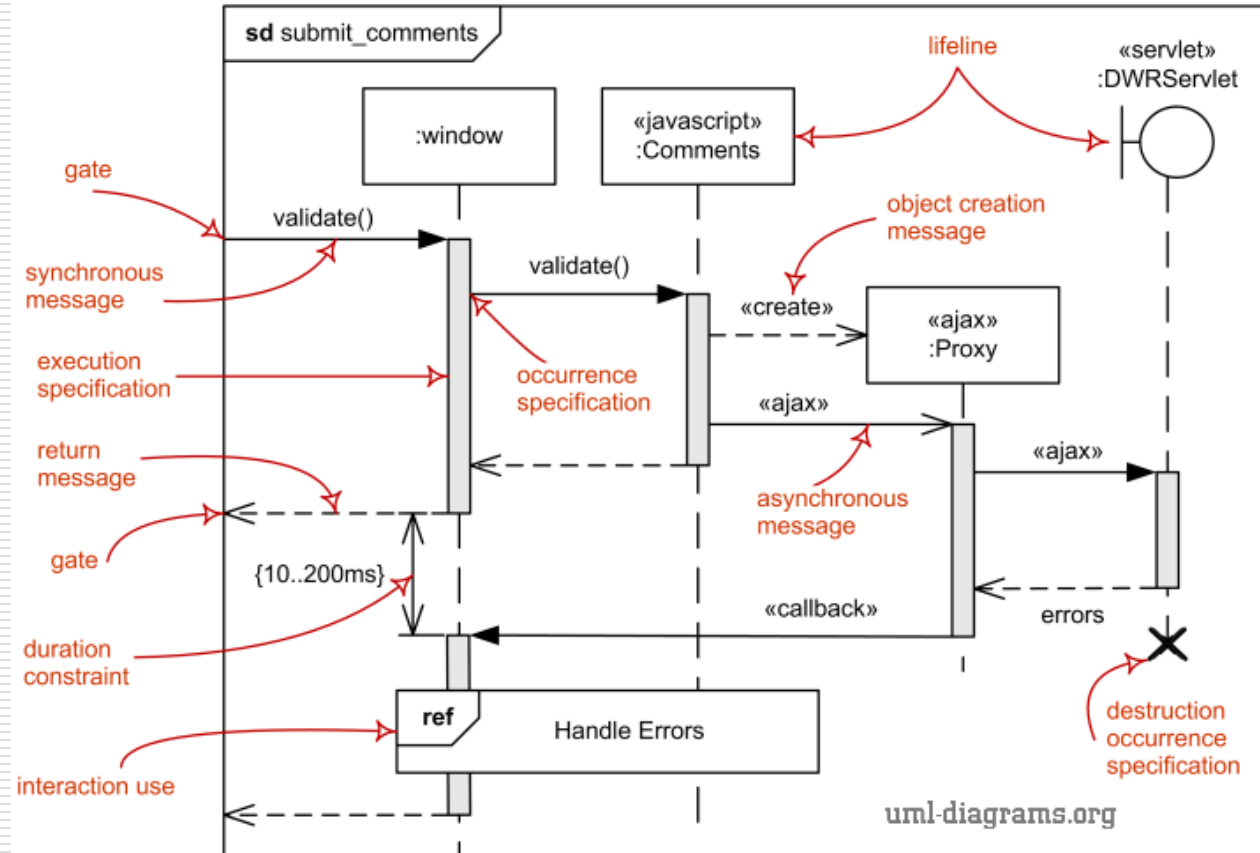
Example Object Diagram



Sequence Diagram

- ❑ A type of *interaction diagram*
 - ❑ Depicts *lifelines* of objects and *sequences of messages* exchanged between objects
-

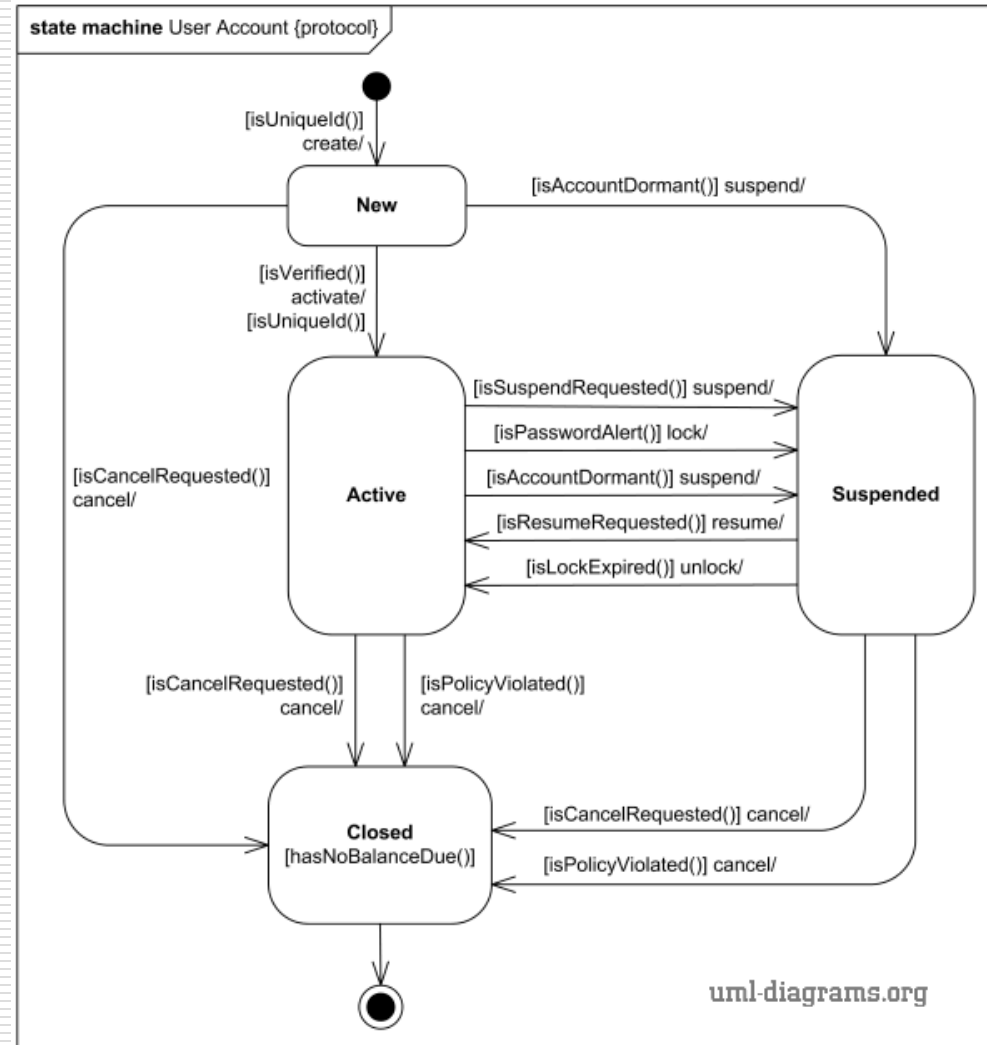
Example Sequence Diagram



State Machine Diagram

- Shows *discrete behavior* of part of designed system through *state transitions*
-

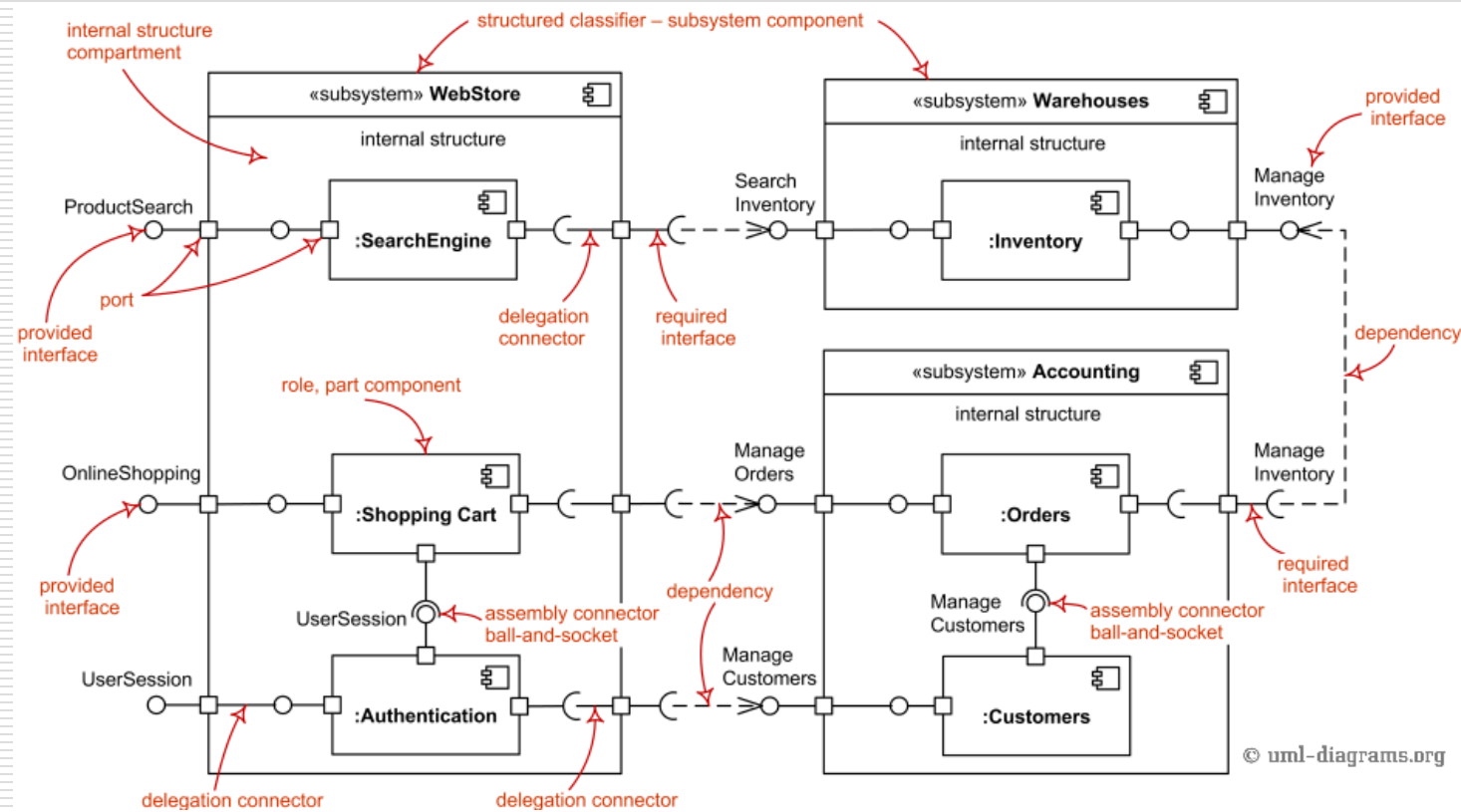
Example State Machine



Component Diagram

- ❑ Show how components are *connected* to create larger components or systems
 - ❑ Depict *components*, *interfaces*, and *ports*
-

Example Component Diagram



Activity Diagram

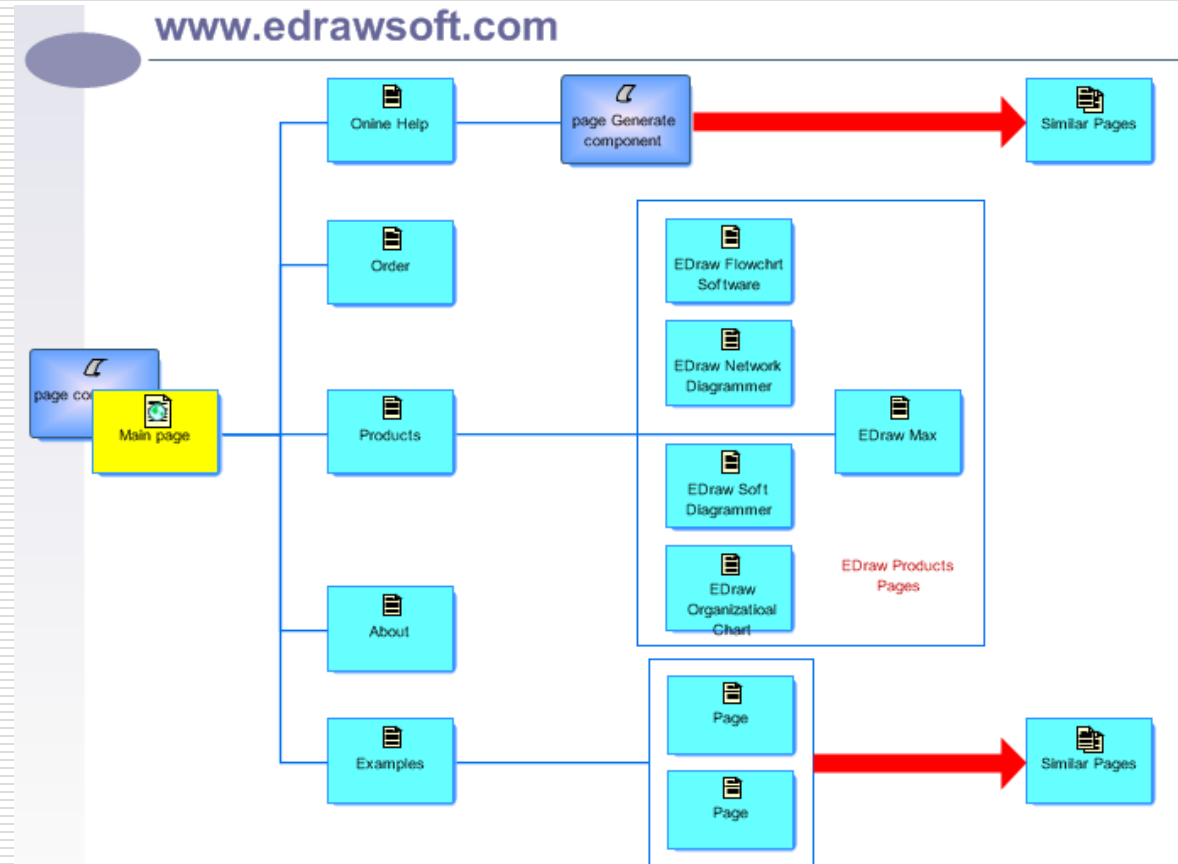
- ❑ Behavior diagram which shows *flow of control* or *object flow*
 - ❑ Emphasizes *sequence* and *conditions* of flow
-

<p> 1.1 Introduction 1.2 Background 1.3 Objectives 1.4 Scope 1.5 Methodology 1.6 Results 1.7 Conclusion 1.8 References 1.9 Appendix 1.10 Index 1.11 Glossary 1.12 Abbreviations 1.13 Acronyms 1.14 Footnotes 1.15 Endnotes 1.16 References 1.17 Appendix 1.18 Index 1.19 Glossary 1.20 Abbreviations 1.21 Acronyms 1.22 Footnotes 1.23 Endnotes 1.24 References 1.25 Appendix 1.26 Index 1.27 Glossary 1.28 Abbreviations 1.29 Acronyms 1.30 Footnotes 1.31 Endnotes 1.32 References 1.33 Appendix 1.34 Index 1.35 Glossary 1.36 Abbreviations 1.37 Acronyms 1.38 Footnotes 1.39 Endnotes 1.40 References 1.41 Appendix 1.42 Index 1.43 Glossary 1.44 Abbreviations 1.45 Acronyms 1.46 Footnotes 1.47 Endnotes 1.48 References 1.49 Appendix 1.50 Index 1.51 Glossary 1.52 Abbreviations 1.53 Acronyms 1.54 Footnotes 1.55 Endnotes 1.56 References 1.57 Appendix 1.58 Index 1.59 Glossary 1.60 Abbreviations 1.61 Acronyms 1.62 Footnotes 1.63 Endnotes 1.64 References 1.65 Appendix 1.66 Index 1.67 Glossary 1.68 Abbreviations 1.69 Acronyms 1.70 Footnotes 1.71 Endnotes 1.72 References 1.73 Appendix 1.74 Index 1.75 Glossary 1.76 Abbreviations 1.77 Acronyms 1.78 Footnotes 1.79 Endnotes 1.80 References 1.81 Appendix 1.82 Index 1.83 Glossary 1.84 Abbreviations 1.85 Acronyms 1.86 Footnotes 1.87 Endnotes 1.88 References 1.89 Appendix 1.90 Index 1.91 Glossary 1.92 Abbreviations 1.93 Acronyms 1.94 Footnotes 1.95 Endnotes 1.96 References 1.97 Appendix 1.98 Index 1.99 Glossary 1.100 Abbreviations 1.101 Acronyms 1.102 Footnotes 1.103 Endnotes 1.104 References 1.105 Appendix 1.106 Index 1.107 Glossary 1.108 Abbreviations 1.109 Acronyms 1.110 Footnotes 1.111 Endnotes 1.112 References 1.113 Appendix 1.114 Index 1.115 Glossary 1.116 Abbreviations 1.117 Acronyms 1.118 Footnotes 1.119 Endnotes 1.120 References 1.121 Appendix 1.122 Index 1.123 Glossary 1.124 Abbreviations 1.125 Acronyms 1.126 Footnotes 1.127 Endnotes 1.128 References 1.129 Appendix 1.130 Index 1.131 Glossary 1.132 Abbreviations 1.133 Acronyms 1.134 Footnotes 1.135 Endnotes 1.136 References 1.137 Appendix 1.138 Index 1.139 Glossary 1.140 Abbreviations 1.141 Acronyms 1.142 Footnotes 1.143 Endnotes 1.144 References 1.145 Appendix 1.146 Index 1.147 Glossary 1.148 Abbreviations 1.149 Acronyms 1.150 Footnotes 1.151 Endnotes 1.152 References 1.153 Appendix 1.154 Index 1.155 Glossary 1.156 Abbreviations 1.157 Acronyms 1.158 Footnotes 1.159 Endnotes 1.160 References 1.161 Appendix 1.162 Index 1.163 Glossary 1.164 Abbreviations 1.165 Acronyms 1.166 Footnotes 1.167 Endnotes 1.168 References 1.169 Appendix 1.170 Index 1.171 Glossary 1.172 Abbreviations 1.173 Acronyms 1.174 Footnotes 1.175 Endnotes 1.176 References 1.177 Appendix 1.178 Index 1.179 Glossary 1.180 Abbreviations 1.181 Acronyms 1.182 Footnotes 1.183 Endnotes 1.184 References 1.185 Appendix 1.186 Index 1.187 Glossary 1.188 Abbreviations 1.189 Acronyms 1.190 Footnotes 1.191 Endnotes 1.192 References 1.193 Appendix 1.194 Index 1.195 Glossary 1.196 Abbreviations 1.197 Acronyms 1.198 Footnotes 1.199 Endnotes 1.200 References</</p>
--

UML Limitations

- ❑ Despite its large collection of diagram types, UML is *not* adequate for all purposes
 - e.g., describing web site structure
 - ❑ If a suitable diagram type can't be found, *create your own*
 - Be sure to *explain* what the diagram elements mean!
-

Example: Website Structure Diagram



Sources

- ❑ *UML in a Nutshell* by S. Alhir
 - ❑ *Introduction to OMG's Unified Modeling Language*,
www.omg.org/gettingstarted/what_is_uml
 - ❑ *Introduction to the Diagrams of UML 2.X*,
www.agilemodeling.com/essays/umlDiagrams
 - ❑ www.uml-diagrams.org/
 - ❑ *UML is Not Enough* by S. Ambler,
<http://agilemodeling.com/essays/realisticUML.htm>
-