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н	Element	Logic Gate Level Element		
	System	Unit of a processor that manipulates registers		
	Components	Logic gates, lines		
	Medium	Single-bit signals		
	Composition Law	E.g., input and output of logic gates are connected through lines		
	Behaviour Law	The laws for composing truth tables of logic gates		
	EASSS 2002	Agent-Oriented Software 43 Engineering		











Agent Lev	vel	
Element	Agent Level Element	
System	Multiagent system	
Components	Belief, goal, action, role, interaction rule	
Medium	Representation of belief, goal and capabilities	
Behaviour Law	Principle of rationality	
Between the knowledge and the social level.		
 Allows to model multiagent systems that: Rely on message passing and on the speech-act theory; Exploits the possibilities of the FIPA infrastructure. 		
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Comparing the Meta-Models			
Element	Objects	Agents	
State	Properties and values	Knowledge base	
Messaging	Request for service with certain parameters	Exchange of parts of the knowledge base	
Reuse	Inheritance, mostly for composability	Composability	
Delegation	Task delegation	Goal delegation	
Responsibility	Design by contract	Pre-/post-conditions	
Type system	Classes	None	
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Case Study
Auction agent
1. The <i>configurator</i> : a GUI component, enables the user to control and monitor the agent's activity
2. The <i>parser</i> : translates retrieved information into an internal structure
3. The <i>bidder</i> : submits bids according to buying strategy.
4. The <i>manager</i> : controls the agent's activity, monitors the auction site, activates the parser, determines the next bid, activates the bidder and terminates the agent's purchasing activity
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	GAIA – Role model	
H	Role Schema: Manager (MA)	_
	Description: Controls the auction agent activities	
	Protocol and Activities: CheckAuctionSite , ActivateParser , CheckForBid , Bid	
	Permission: reads supplied ItemNumber // the item number in the auction site AuctionDetails // the auction information	
	Responsibilities: La Vees: Manager = (CheckAuctionSite . ActivatePurser . CheckForBid y[Bid] Safty: sufty: true	
	The Manager role scheme EASSS 2002 Agent-Oriented Software Engineering	91











Diagrams \ stage:	Requirements	Analysis	Design	Implementatio
Class		+	+	
Object		+	+	
Component			+	+
Deployment			+	+
Sequence	+	+	+	
Collboration	+	+	+	
Use Case	+			
Statechart		+	+	
Activity		+	+	
Package		+	+	
Model			+	+
Subsystem			+	+
Extension Mechanism			+	+
Agent Interaction Protocol		+	+	

UML	
Structural Diagrams	
- Class Diagram - A class diagram is a graph of	
Classifier elements connected by their various static relationships	
 Object Diagram - An object diagram is a graph of instances, including objects and data values 	
 Component Diagram - A component diagram shows the dependencies among software components, 	
including the classifiers that specify them and the artifacts that implement them	
- Deployment Diagram - A deployment diagram show	s
the configuration of run-time processing elements and	
the software components, processes, and objects that	
execute on them EASSS 2002 Agent-Oriented Software Engineering	98



	UML	
L	Model Management Diagrams	
	 Packages - A package is a grouping of model elements. 	
	 Subsystems – A subsystem represents a behavioral unit in the physical system, and hence in the model. 	
H	 Models - A model captures a view of a physical system. Hence, it is an abstraction of the physical system with a certain purpose; 	
	Extension Mechanism	
	 Constraints - A constraint is a semantic relationship among model elements that specifies conditions and propositions that must be maintained as true; otherwise, the system described by the model is invalid 	
	 Comments - A comment is a text string attached directly to a model element 	
	 Stereotypes - A stereotype is a new class of metamodel element that is introduced at modeling time 	
	 Tags - A tag definition specifies the tagged values that can be attached to a kind of model element. 	
	EASSS 2002 Agent-Oriented Software 10 Engineering	00





































































































	Example – Song Seller	
н	_ParADE imports public class Bhop extends ShopAgent { protected void init() { _set the agent model	
	<pre>dog anyDdng - see Sonytariable("v");' // Diama to achieve intentions // If anyDdng': 'sequests for a song and the song is evaluable, then execute 'ActionBody' productItion productions // intention to achieve new ActionBody() { // the action to perform to achieve the intention public void body(doal g) {</pre>	
	<pre>sell.perform(); forget(intendfeall.getAgent(), dome)); abliewed(dom); } }; Song GosHeadlight = new ConcreteBong(*OnsHeadlight*, 1000); beliewei.weilable(me, GosHeadlight);</pre>	
	ConcreteAgent:receiver + new ConcreteAgent(receiver); schedule(inform(receiver, available(se, Chelleadlight))); } }	151
	Engineering	





























































































