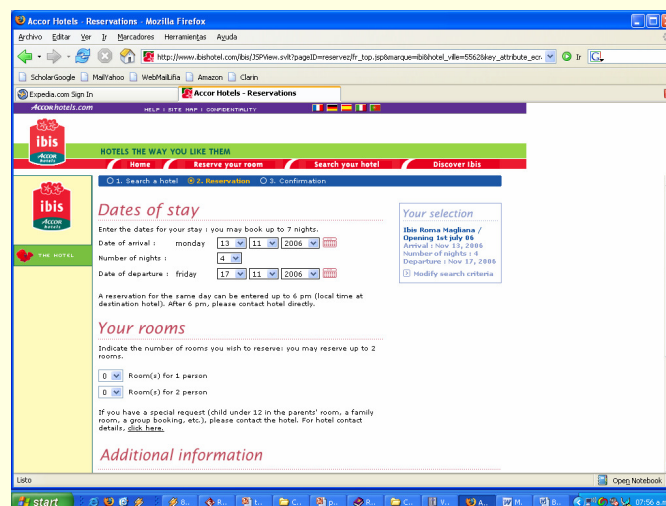


# Business Processes in Web Apps

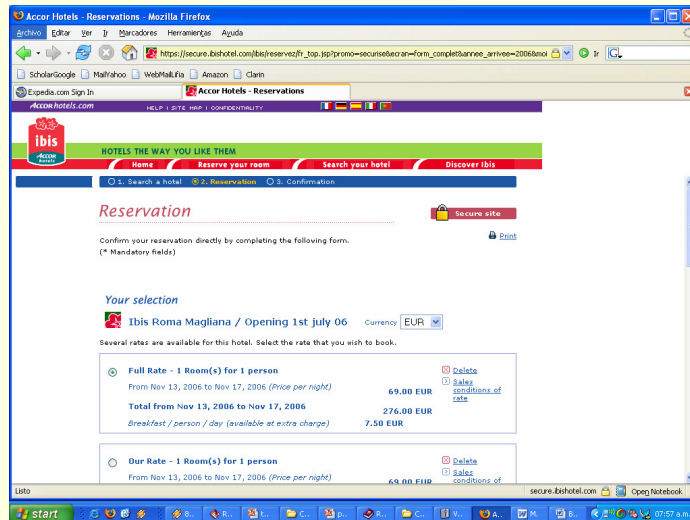
- **Context:** In a business process like the checkout process, the user has to go through a predefined sequence of activities: login, confirm the selection made, enter the address or other relevant personnel data, select some delivery options, ways of payment, etc., before the process is completed successfully.
- **Usual Solution:** This kind of processes is often emulated as a sequence of navigation steps, both with regard to modeling and implementation. That means each activity is mapped to one (or more) Web pages that are treated in the same way as other navigational objects (products, plane itineraries, etc)



# Another Example



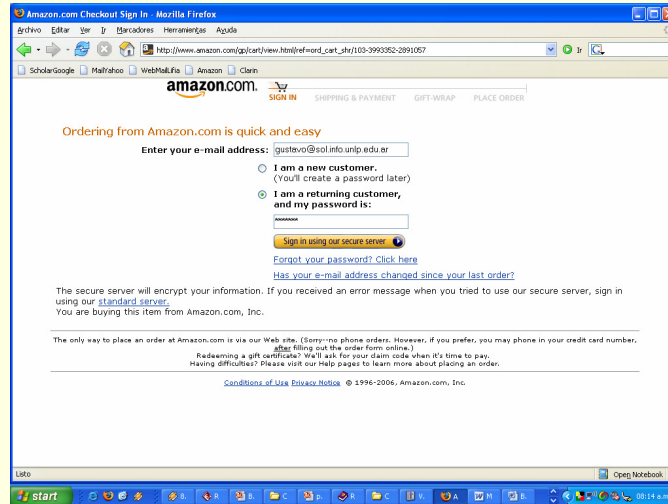
And then....



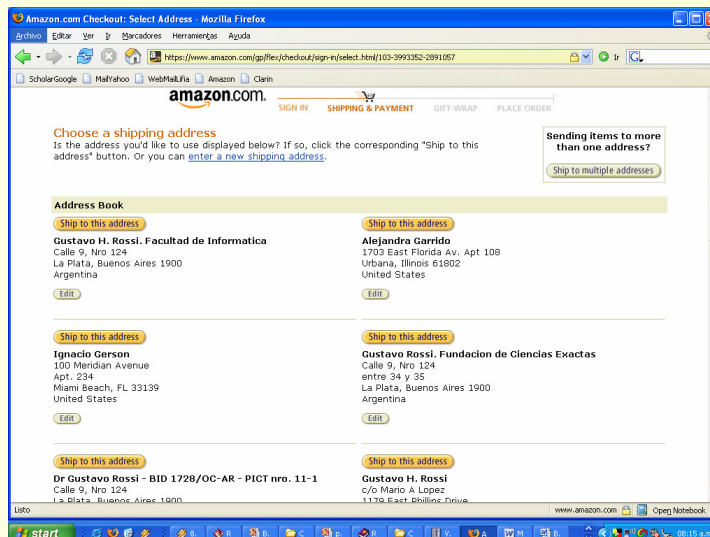
Checkout process. The Amazon solution



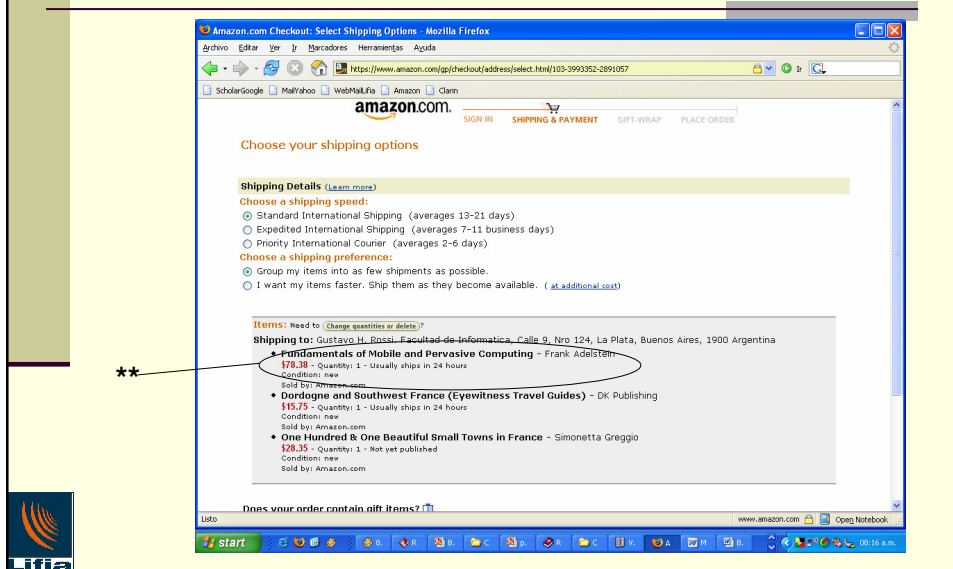
# Next



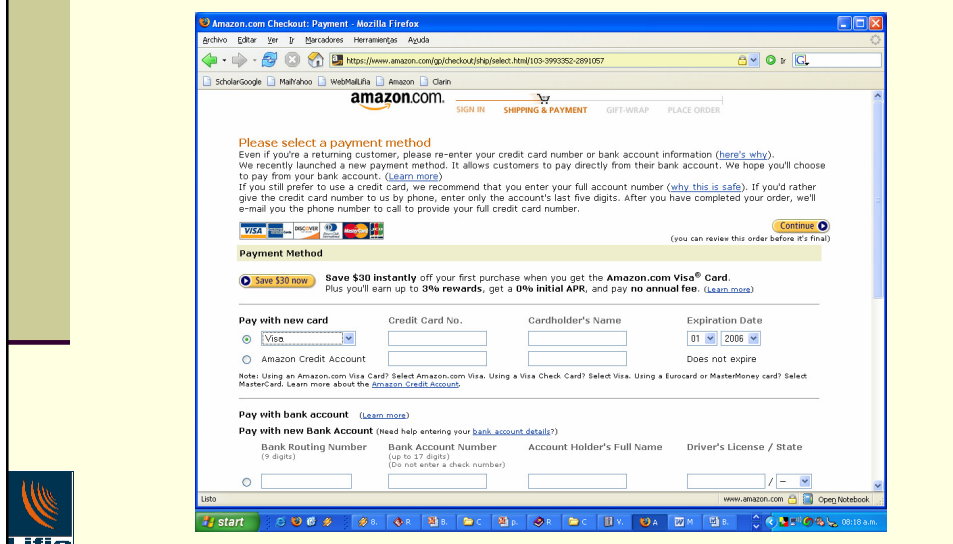
# Next



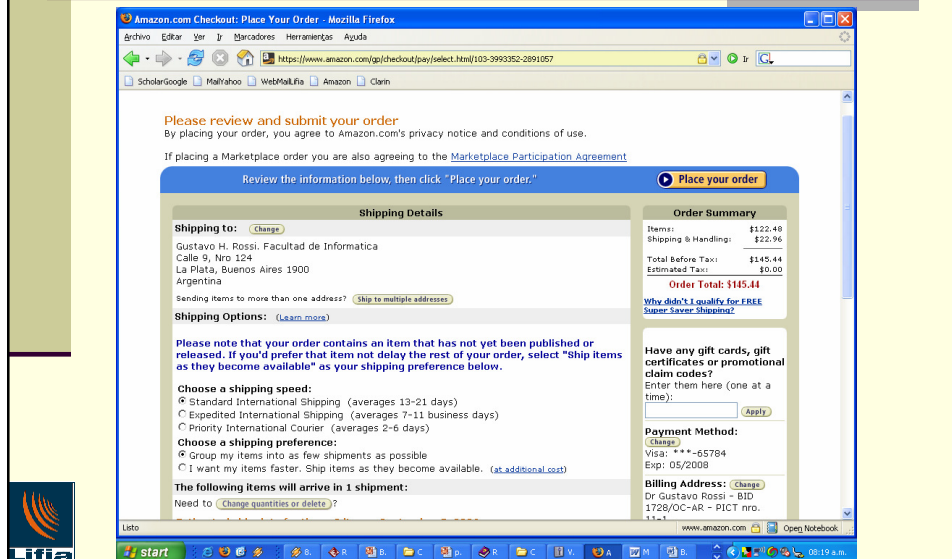
# Next



# Next



## And Finally



## Comments on the Process

- No Navigation outside the process in Amazon
- Why
- Is it impossible?
- What about backtrack
- Suppose you are in the checkout at the supermarket?
  - When do you tolerate to finish? Would you like to change? Perhaps only in the SC?

## Problems with checkout example?

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(See also reservations in Expedia, Avis.com, etc)

- **-User disorientation:** “what happens if I add the product to the cart again? Should I start the checkout again?”
- **-Inconsistent process states:** in which state does the previous process remain if the user does not return immediately?; for example what happens if he begins shopping again and wants to checkout once more?
- **-Inconsistent or unpredictable share objects states:** suppose that while exploring the product, he adds it to the cart; will this product be considered in this process? If he backtracks to the confirm items page, should this new product appear? Is the current list accurate?



## More Problems....

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- Treating business processes just as navigation sequences also prevents the user from dealing with more than a process at a time. Suppose he is booking a flight, and before finishing he wants to rent a car from the destination airport: an application like [www.expedia.com](http://www.expedia.com) urges him to navigate to the second process, which is just an ordinary page, and then backtrack to the point in which the booking was left instead of just resuming the suspended process (e.g. by selecting the “flights” icon).



## Business Process

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- A business process [10]:
- Drives the user through its activities. That means that it defines the set of activities to be executed, and the control flow among them. In contrast, navigation is user-driven and random.
- Has a state that consists of the current activity, including the knowledge if it is active or suspended, and the previously performed activities (with a simple control flow, these can be implied from the current activity). As a consequence, the process state does imply which activities you have already executed (i.e. the history), and also which activities you have to perform subsequently. In contrast, the state of navigation is usually represented by the Web page displayed by the browser.



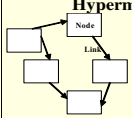
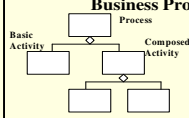
## Therefore

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- A business process has to keep internally its complete state; the current node on the screen does not contain sufficient state information.
- When a user navigates out of a business process like checkout or hotel booking, it must be clarified if the user wants to terminate the process or to suspend it and resume it at a later time. If the user wants to suspend it, the state of the process must be stored and conserved. In this way, if the process is resumed, it can be resumed in the state it was, when it was suspended. Since the business process defines all activities through which to go, it will guide the user after resuming the process through the pending activities.



## BP vs Web/Hypermedia

	 <p><b>Hypermedia</b></p>	 <p><b>Business Processes</b></p>
<b>Structure</b>	A flat network of nodes connected by links	Process composed of activities that are basic or composed
<b>Control</b>	The user always has control on the sequence of visited pages. The next page to be accessed is selected by following a link	The process defines which is the next activity to be performed. Activities are often performed sequentially, though the control flow may be more complex
<b>Leaving Page/ Activity</b>	A page is left by just selecting an anchor and navigating a link. Its state does not change. There is no notion of completion.	When an activity is left it must be clear if it is completed, suspended or aborted. The notion of activity completion is essential in the business process paradigm
<b>Resuming/ Undoing</b>	Backtracking to a page (for example by clicking the back button) just means navigating to the page again	Returning to an activity resumes it at the current suspended state; Undoing an activity must be explicitly indicated

## The OOHDM approach for BP

- Define Processes and Activities as first-class objects
- Decouple activities from the control flow (defined by the parent's process)
- Allow different chain of activities for the same BP, according to the possible needs

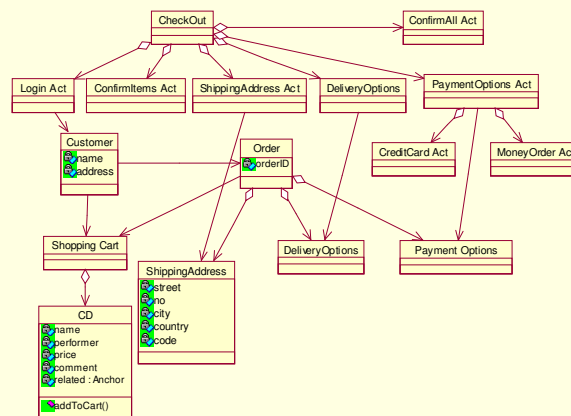


## In the Navigational Model

- Define Activity Nodes (the hypermedia view of Activities)
- Separate the navigational view of the process from the rest of the navigation space
- Change the semantics of outgoing and incoming links



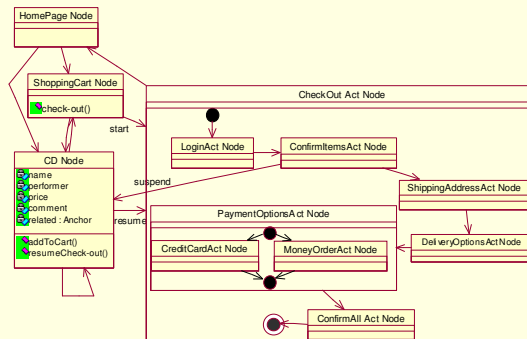
## Example: Check-Out



Conceptual Model: Notice that activities are modeled as classes



## Example: Check-Out



Navigational Model: Notice the incoming and outgoing links

## Activities as first-class objects

- Activities support operations for start/cancel/suspend/resume
- Child activities are started by their parent activity
- Parent activities have the responsibility of the control flow
- Decoupling child activities from the control flow allow reusing activities (e.g. CreditCard Act)

## Navigation vs Process logic

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- The flow of activities is not considered navigation
- However (different from the Amazon solution) we consider that navigation is fundamental in Web applications
- Navigating outside a process implies suspending the process
- Returning to the process implies resuming the process



## Modifying the Semantics of OOHD Anchors/Links

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- We have modified the OOHD meta-model in order to support this new requirement by slightly changing the default anchors' behavior in activity Nodes: instead of initiating navigation immediately, the anchor performs some operations to ensure that processes remain in the correct state.

**Exercise: How do we achieve this?**



## Exercise

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- Discuss what we need to do when the process is resumed
- Which kind of links should be allowed?
- Can we provide completely “free” navigation?

**10 Minutes**



## Navigational Contexts Vs. BP

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- Review of OOHDN Navigational Contexts
- Review of Roles in Navigational Models

Exercise:

- Can we constrain the kind of links/behaviors in a Node (e.g. CD) when it is accessed from a process? How?



## Open Problems for BPs

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- How to specify the workflow logic of the activities comprised by the BP
- Making BP reusable
- See [BPEL4WS V1.1 specification](ftp://www6.software.ibm.com/software/developer/library/ws-bpel.pdf) in <ftp://www6.software.ibm.com/software/developer/library/ws-bpel.pdf>



## Customizing BP

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- BPs should not be “one size fits all”
- We should be able to customize them
- Types of customization:
  - Customizing according to profile
  - Customizing according to the individual



## Exercise

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- Define an ExpressCheckOut process from the previously defined example
- Problems to address:
  - Which customization issues correspond to navigation and which to the conceptual model?
  - How to customize control flow? (Analyze the role of the user profile component)

**20 minutes**

