

# Use Cases and Controllers

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## Use Case

- ◉ Describe an interaction between a user and a system
  - ◉ Spans multiple commands
  - ◉ Is intended to perform a task
- ◉ Examples:
  - ◉ Buy a book online
  - ◉ Buy gas at a pay-at-the-pump service station.

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# Terminology

- ◉ Actor - an active entity in the use case
- ◉ Generally a user
- ◉ Can include other entities external to the program - printer, database, gas pump, ...

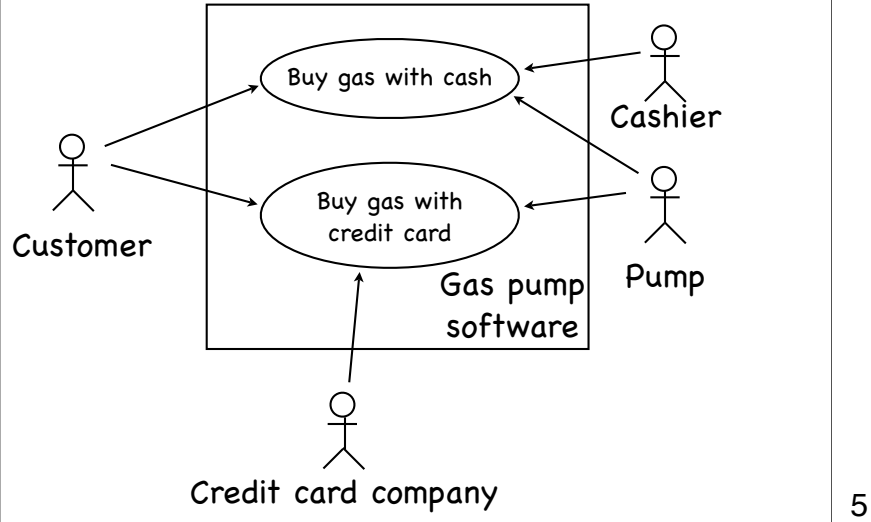
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## Example Use Case - Pay at the Pump

1. Customer inserts credit card.
2. Customer removes credit card quickly.
3. System authorizes credit card.
4. Customer remove nozzle from pump.
5. Customer selects grade of gasoline.
6. System authorizes pump.
7. Customer pumps fuel.
8. Customer returns nozzle to pump.
9. System charges credit card.
10. System prints receipt.

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## Example Use Case Diagram



## Use Case Controller

- Manages the control flow through a use case
- Localizes knowledge of the control flow, making it easy to change.
- Coordinates actions taken by the user, the user interface and system responses.
- Can be customized by applying the Strategy pattern.

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## Controller

- Receives events from other components
- Determines what action the system should take in response
- Typically create a new instance of a controller each time its use case starts
  - Controller classes sound like active entities, like GasPumpManager or HandPlayer
  - Often, each instance executes in its own thread.

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## Pay with Credit Card Controller

```
public class PayAtPumpController implements Runnable {
    public void run() {
        authorizeCreditCard();
        pumpGas();
        chargeCreditCard();
        printReceipt();
    }
}

new PayAtPumpController().start();
```

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# Java Servlet Model

- Apache - Web server
- Tomcat - servlet container inside Apache
- Install your servlet where Tomcat can find it, accessible from the network via a URL
- When your servlet URL is used, Tomcat creates a thread to run your servlet to handle one user request
- Use session to manage data that needs to persist between requests, like an order that is being processed

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## Example

Function	Servlet
Enter the bookstore	BookStoreServlet
Create the bookstore banner	BannerServlet
Browse the bookstore catalog	CatalogServlet
Put a book in a shopping cart	CatalogServlet, BookDetailsServlet
Get detailed information on a specific book	BookDetailsServlet
Display the shopping cart	ShowCartServlet
Remove one or more books from the shopping cart	ShowCartServlet
Buy the books in the shopping cart	CashierServlet
Receive an acknowledgement for the purchase	ReceiptServlet

↑  
Use cases

↑  
Controllers

From [http://java.sun.com/j2ee/tutorial/1\\_3-fcs/doc/Servlets3.html](http://java.sun.com/j2ee/tutorial/1_3-fcs/doc/Servlets3.html)

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