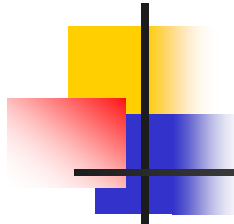




Servlet Life cycle



Java

- JAVA as an object oriented language
 - Learned from experiences of other OO languages
 - More completely defined library
- JAVA as a platform
 - JAVA virtual machine (JVM)
 - More completely defined run time environment
 - “develop once, run everywhere”
- JVM
 - Class loader
 - Byte code checker
 - Security Manager



Process and threads

- Process: A program in execution. It consists of the executable program, the program's run time status
 - Data
 - Stack
 - Program counter
 - Registers
- Thread: a program in execution, but is part of a process. It consists of its own:
 - Stack
 - Program counter
 - Registers
 - Share data with other threads of the process



Contrast of process vs. thread

■ Process

- Takes more time to create
- More secure
- More fault tolerant

■ Thread

- Takes less time to create
- Offers multiple threads of execution
- Share information with other threads
- Less secure
- More vulnerable to crashes



JVM and servlets

- UNC Charlotte server configuration
 - All servlets share the same JVM
 - Servlets are loaded when they are first called and stay loaded
 - Update to servlets needs to be reloaded
- For production servers, servlets are often pre-loaded
- Servlets can have dedicated JVM's to help with reliability



Servlet life cycle

- Each servlet instance is loaded once
- Each execution happens in a separate thread
- Method `init()` is only called once during initialization of the servlet
- Method `service()` is invoked every time a request comes it. It spawns off threads to perform `doGet` or `doPost` based on the method invoked
- Method `service` should not be redefined
- Method `doGet` and `doPost` typically need to do perform the same actions (p.36)



Data synchronization over multiple threads

- Consider the example of a shopping cart application implemented using a servlet.
- Suppose one browser wants to bump the items ordered from 1 to 3
- Suppose another browser wants to change the items ordered from 1 to 0
- Suppose the submit buttons are pressed at exactly the same time
- We cannot predict what would be the final number of items ordered



Single thread model servlet

- Single thread servlet is possible
- It can avoid many of the data synchronization issues
- However, it severely limits performance



destroy method

- Before the servlet is removed, the destroy method is invoked
- It can be used to “clean up” environments such as database connections.