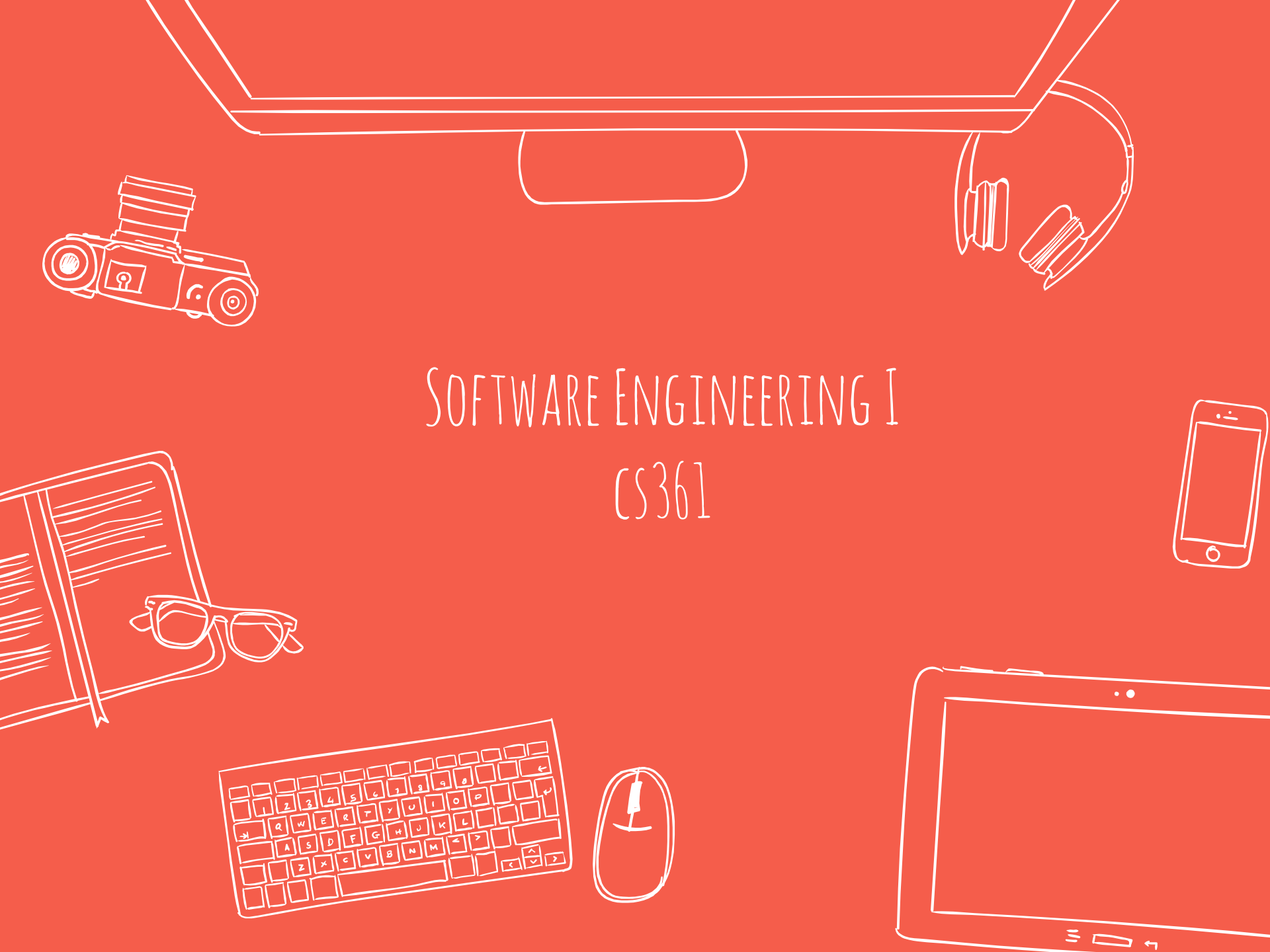
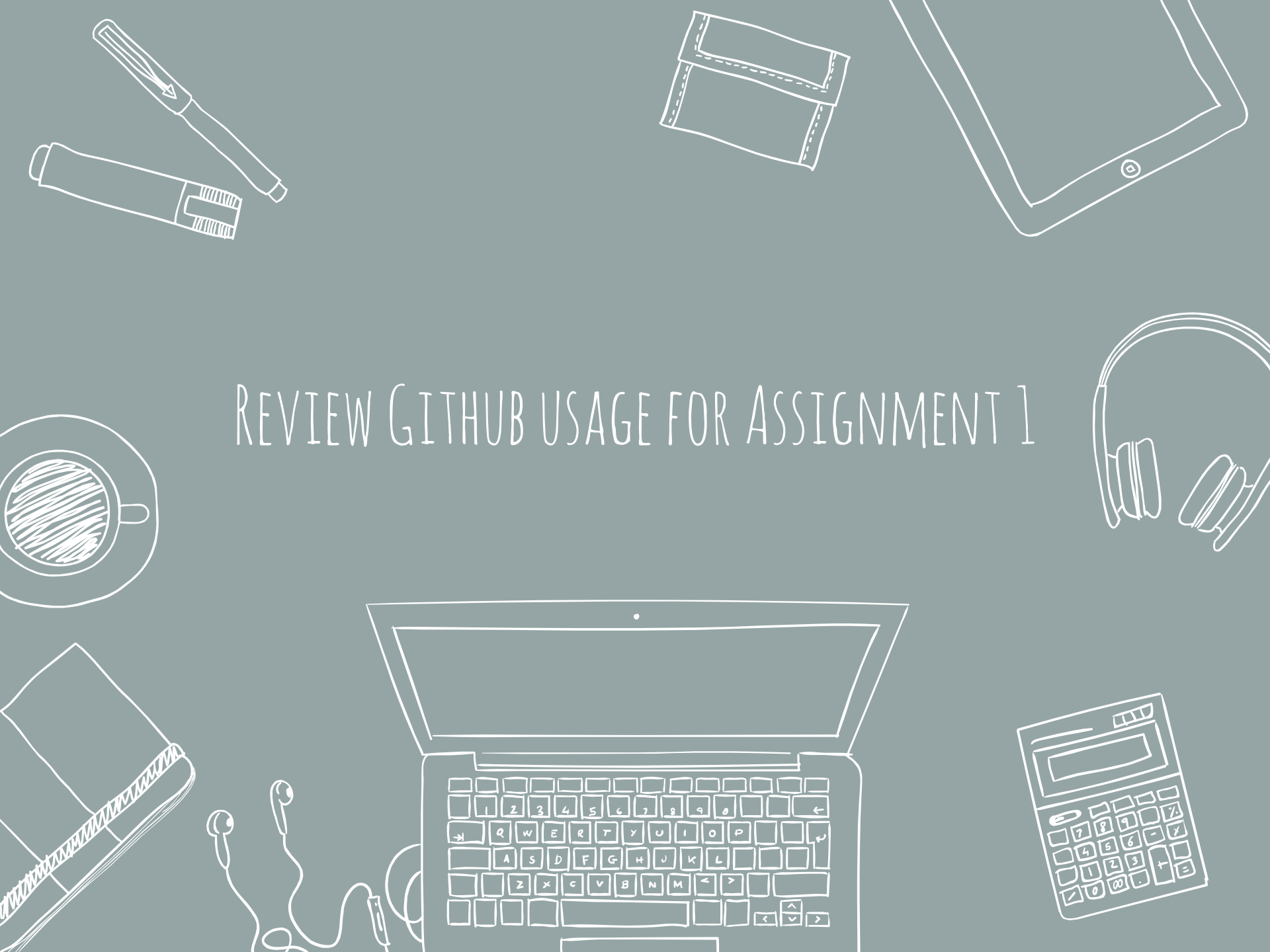
Software Engineering I

CS361

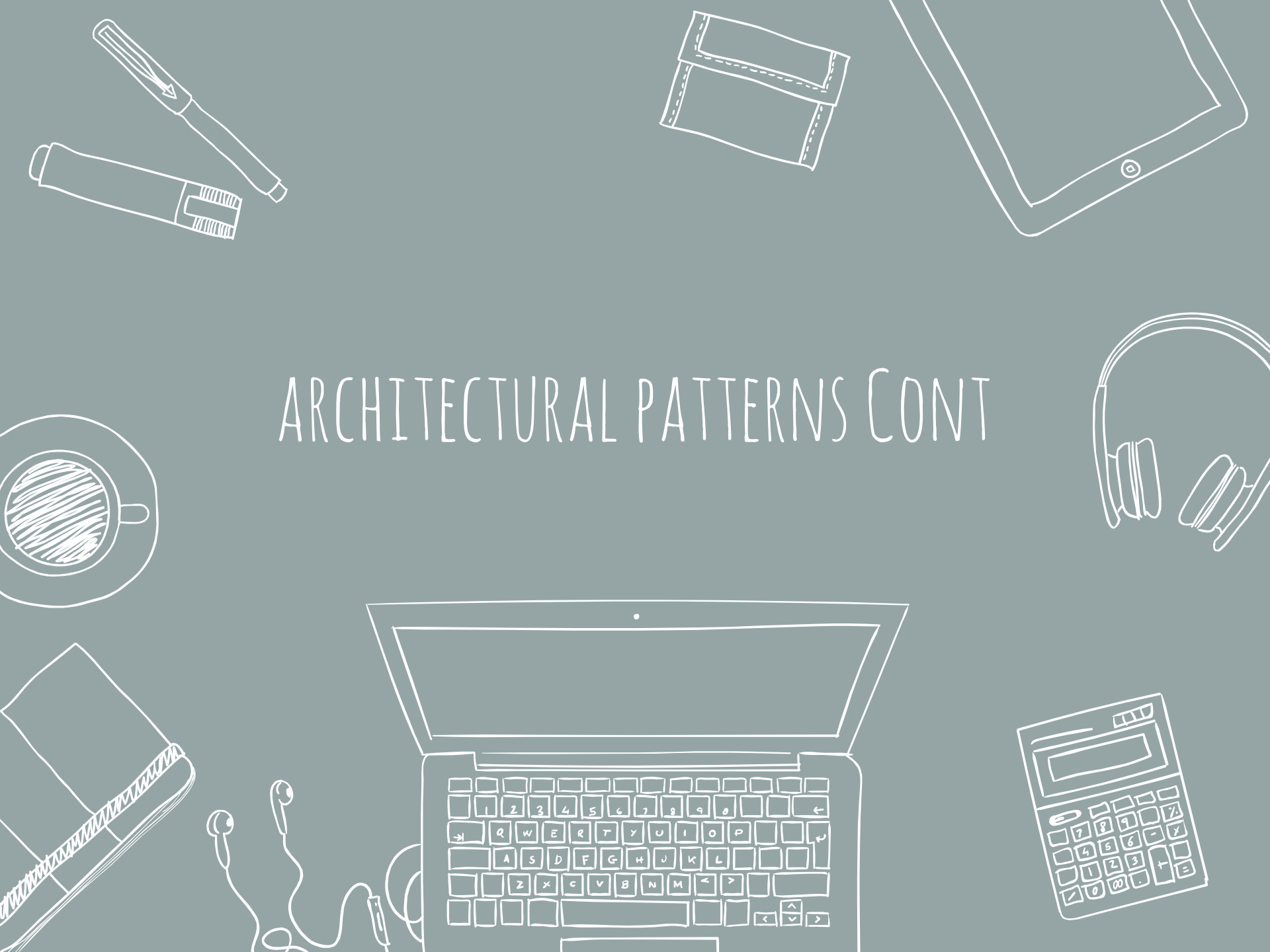


Announcements

Review Github usage for Assignment 1



Architectural patterns Cont



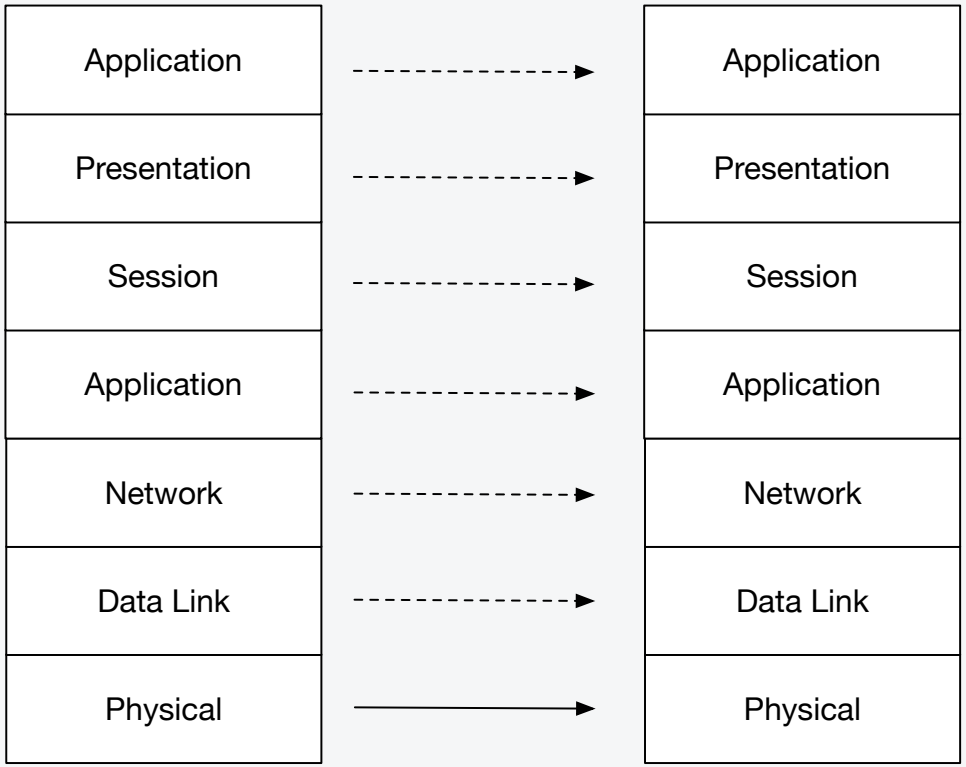
Architectural Patterns

- ✖ MVC
- ✖ Layers
- ✖ Microservices
- ✖ Peer-to-Peer
- ✖ Pipe and Filter
- ✖ Service-Oriented architecture
- ✖ Event-Driven Architecture
- ✖ Blackboard

Layers

The Layers architectural pattern helps to structure applications that can be decomposed into groups of subtasks in which each group of subtasks is at a particular level of abstraction.

Layers


Application
Presentation
Session
Application
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Application
Presentation
Session
Application
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Layers

Benefits:

- Makes reuse easier
- Makes individual layers interchangeable
- Layers interact clearly defined

Layers

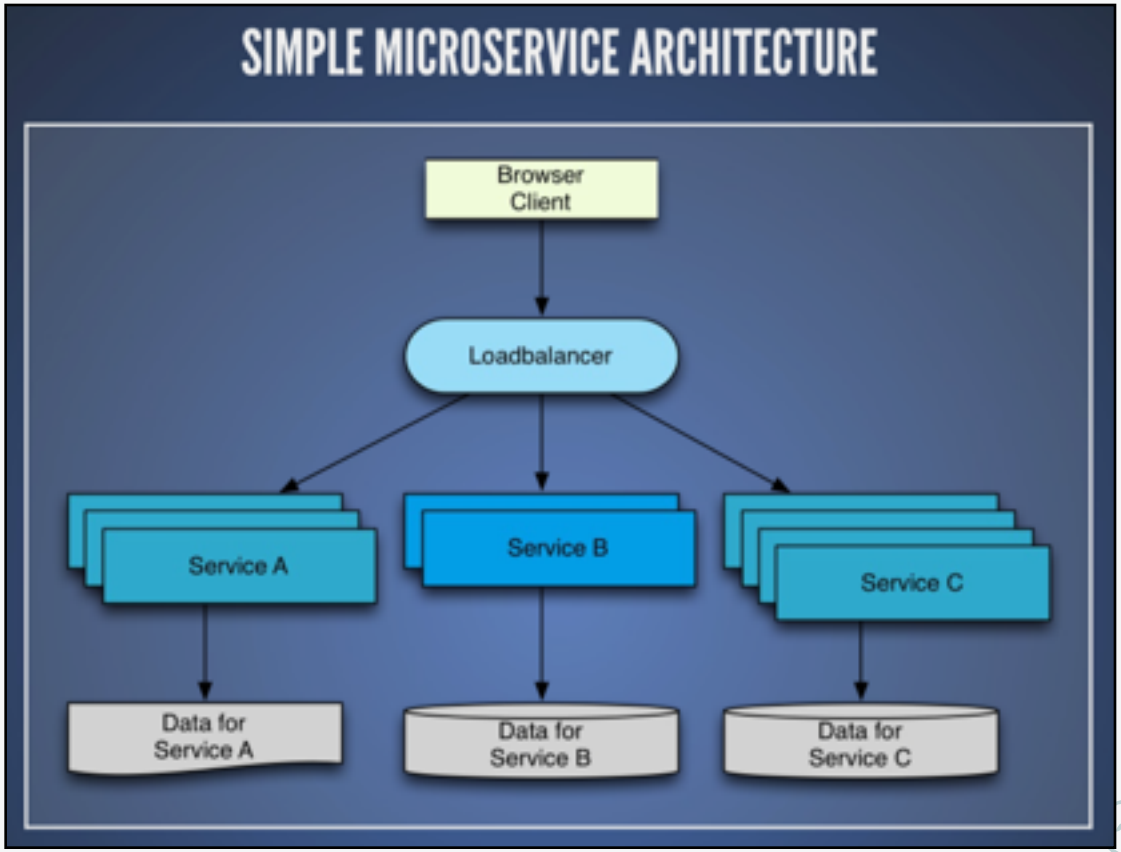
Drawbacks:

- Possibly less efficient then monolithic solution
- Layers sometimes introduce unnecessary work

Microservices

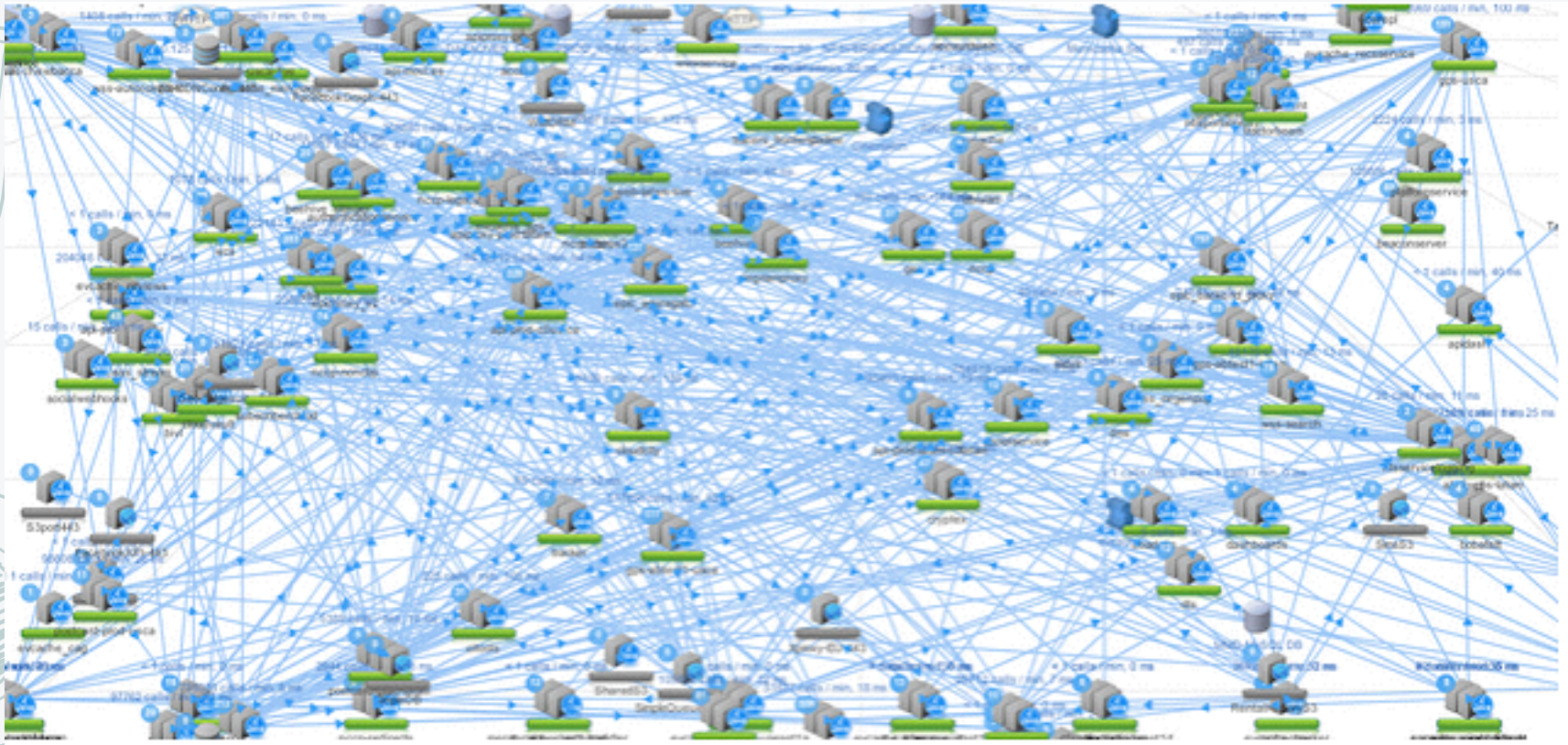
A pattern where software systems provide minimal functional core which then can be expanded with extended functionality.

Microservices



https://speakerdeck.com/rossbachp/wjax2014-docker-tomcat-microservices

Microservices



http://techblog.netflix.com/2013/01/announcing-ribbon-tying-netflix-mid.html

Microservices

Benefits:

- Strong Module Boundaries
- Independent deployment
- High diversity of technology

Microservices

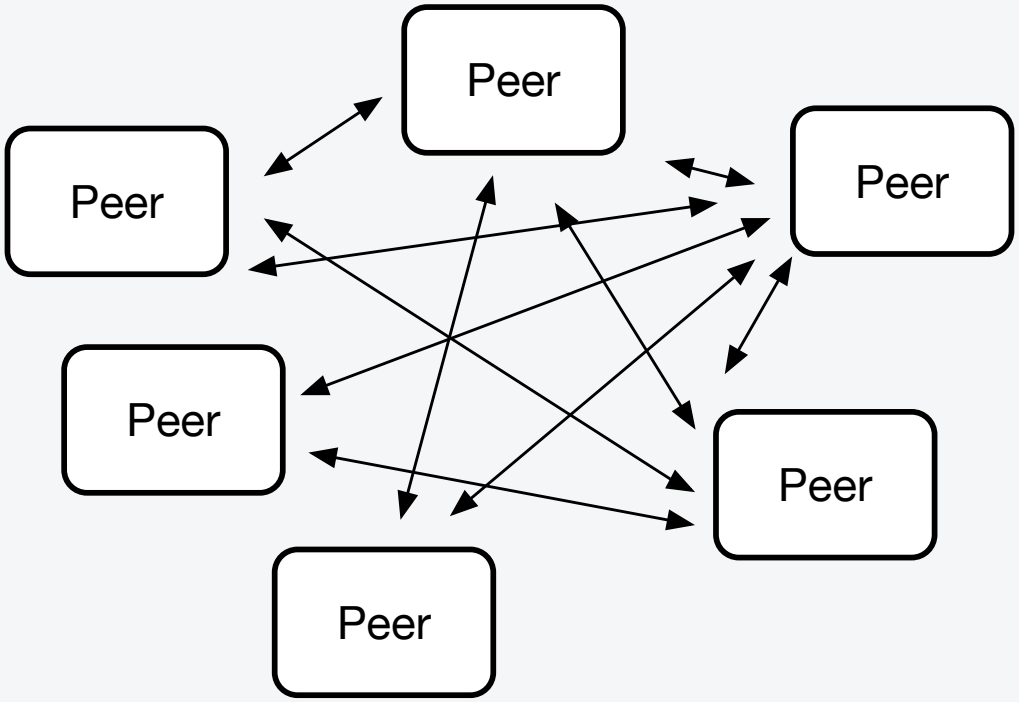
Drawbacks:

- Distribution adds complexity
- Eventual Consistency must be managed
- Higher operational complexity

Peer-To-Peer

A group of peer nodes where every peer simultaneously functions as a client and a server

Peer-To-Peer



Peer-To-Peer

Benefits

- All resource shared
- More reliable with no single point of failure
- Costs less to build and maintain the network

Peer-To-Peer

Drawbacks

- Less Secure
- Hard to Backup
- No centralized authority

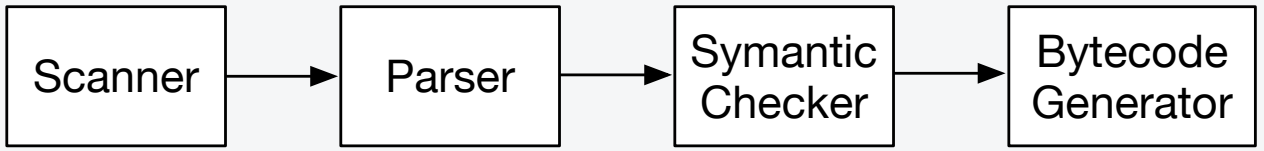
Pipe and Filter

Provides a structure for systems that process a stream of data. Each step (filter) processes the data and passes is on to the next step. Can be composed in any order.

Pipe and Filter

```
cat input.txt | grep "text" | sort > output.txt
```

Pipe and Filter



Pipe and Filter

Benefits

- Flexible behavior
- Filters can be reused
- Ease of debugging

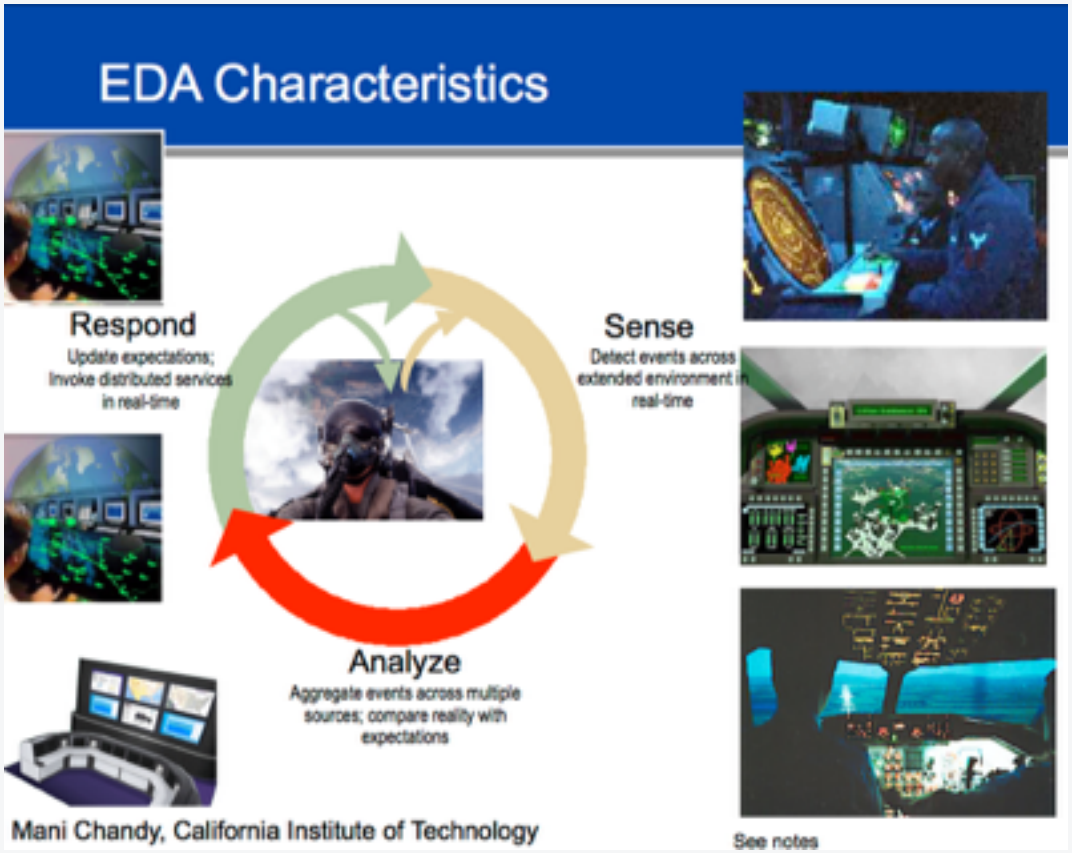
Drawbacks

- Error handling can be difficult
- Cannot share state between filters

Event Driven Architecture

An external change in state (event) causes the application to respond to the change in events. Built with component models with no direct connection with each other.

Event Driven Architecture



http://infospheres.caltech.edu/sites/default/files/Event-Driven%20Applications%20-%20Costs,%20Benefits%20and%20Design%20Approaches.pdf

Event Driven Architecture

Benefits:

- Broadcast Communications
- Asynchrony built in
- Events distributed in timeliness

Event Driven Architecture

Drawbacks:

- Can be a little Brittle
- Different understanding of events can lead to problems

Credits

Special thanks to all the people who made and released these awesome resources for free:

- Presentation template by SlidesCarnival
- Photographs by Unsplash