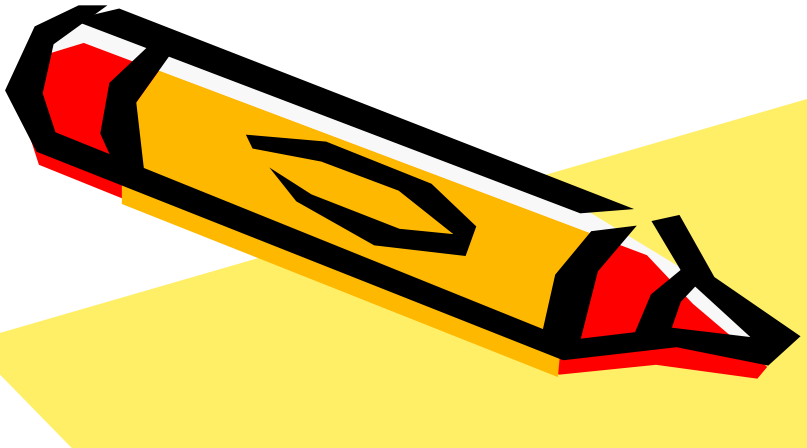

SOA and EDA
An Architectural Viewpoint

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Indian Institute of Technology Bombay
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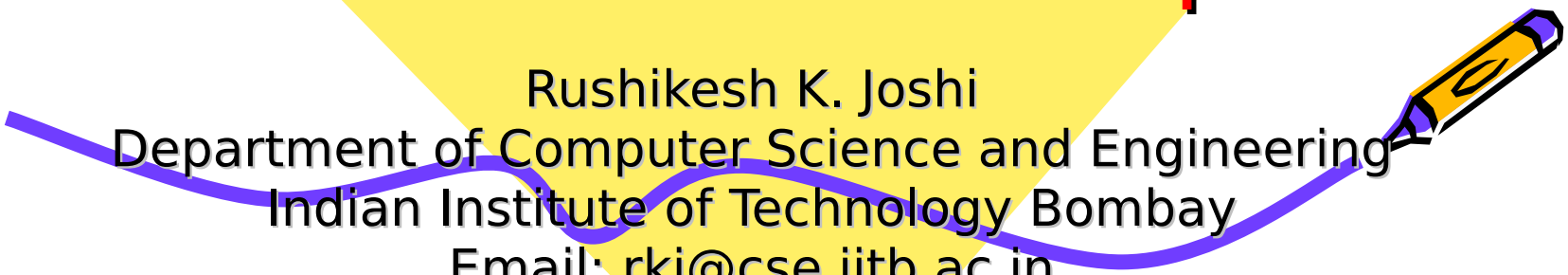
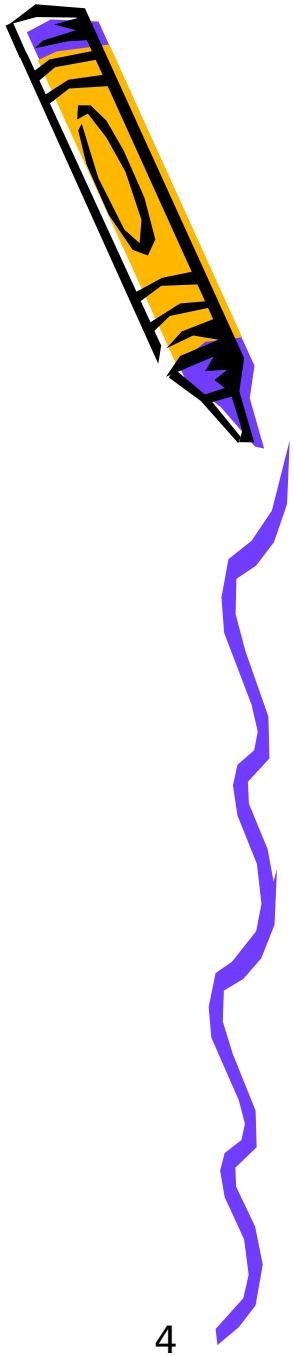


Programming On the Web

- HTTP based communication protocols
- Web servers receive external requests
- Applications pick up the requests from web servers

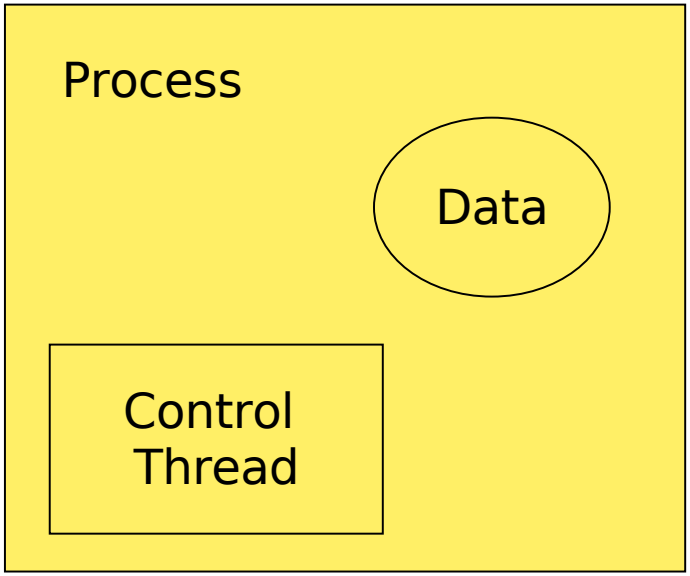
Applications

Read-only pages, Email, Chat, Search engines, news-servers, citation index, bibliographies, online courses, video conferencing, online services and transactions, conference management servers, gaming, journal review processes, books and multimedia, governance and business processes..

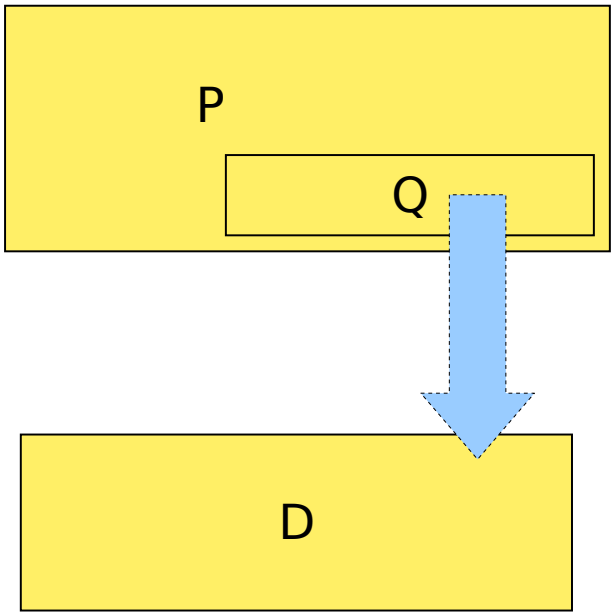


Let's look at some architectural variations

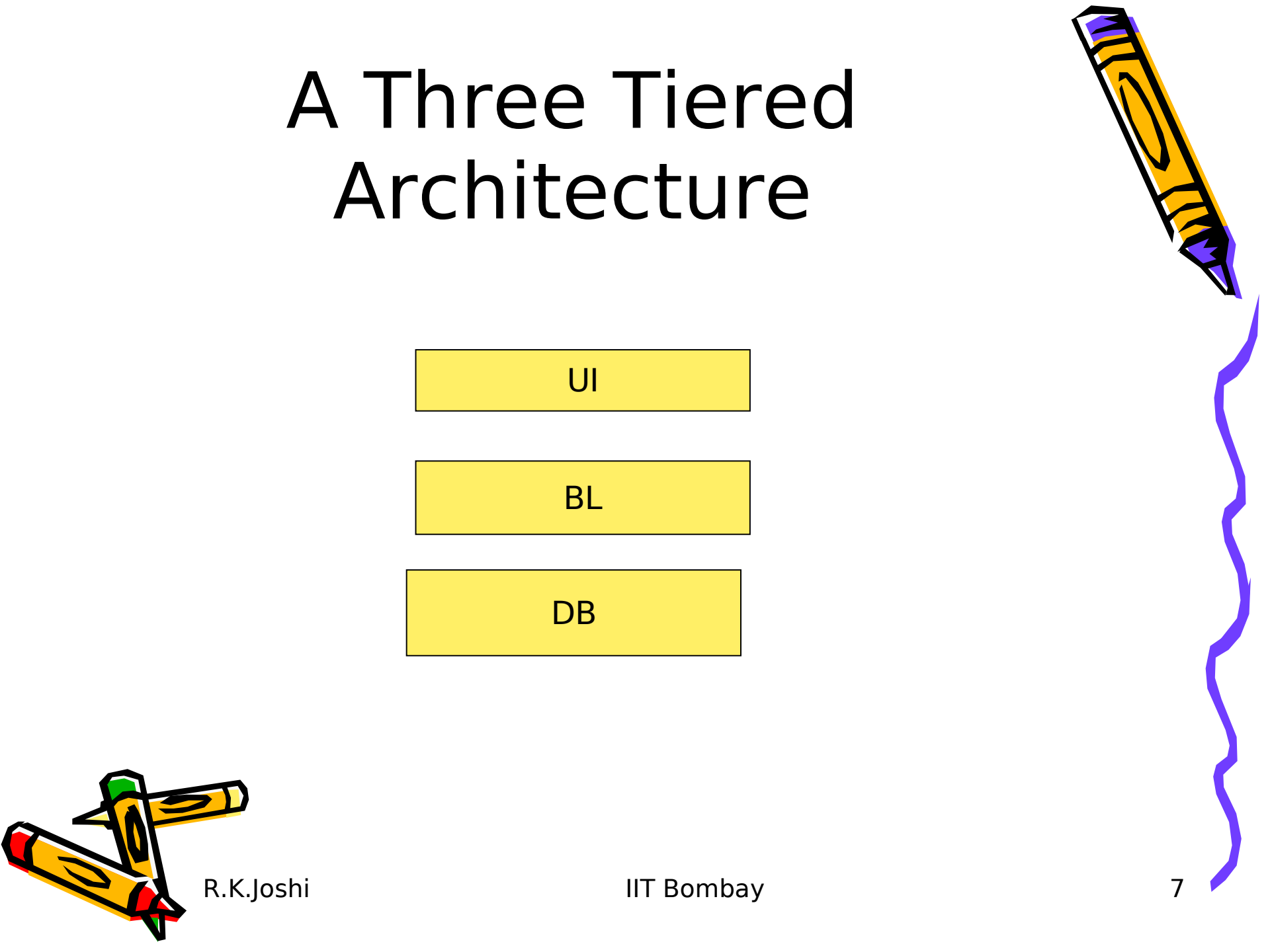
A Single Process Simple Monolithic Application



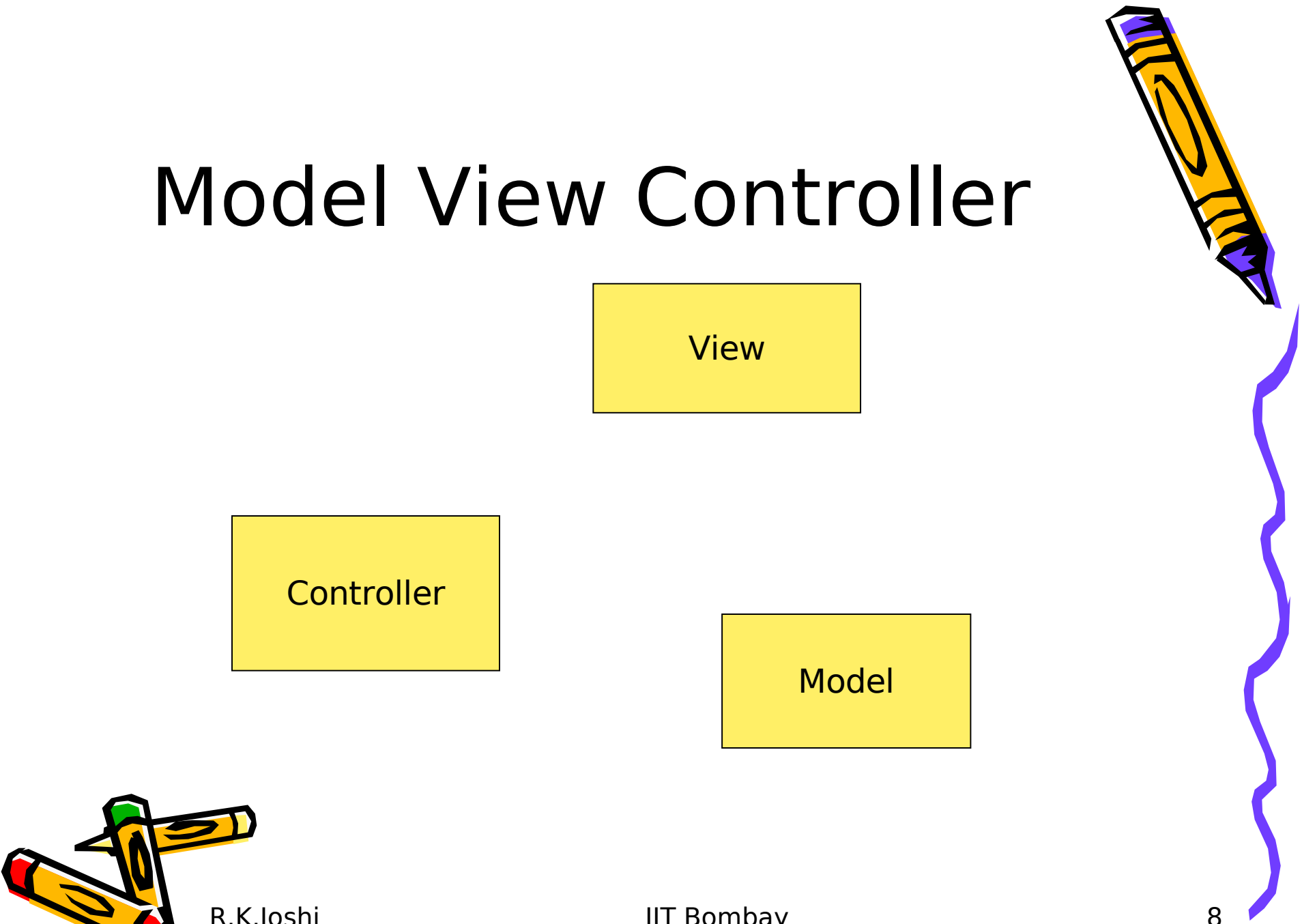
A Data-oriented Application



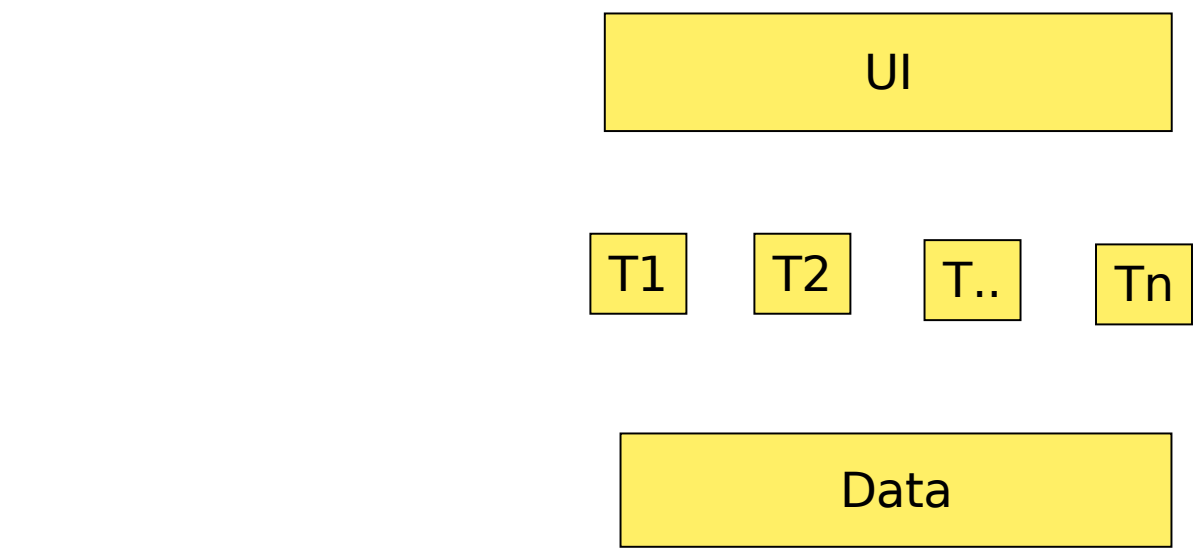
A Three Tiered Architecture



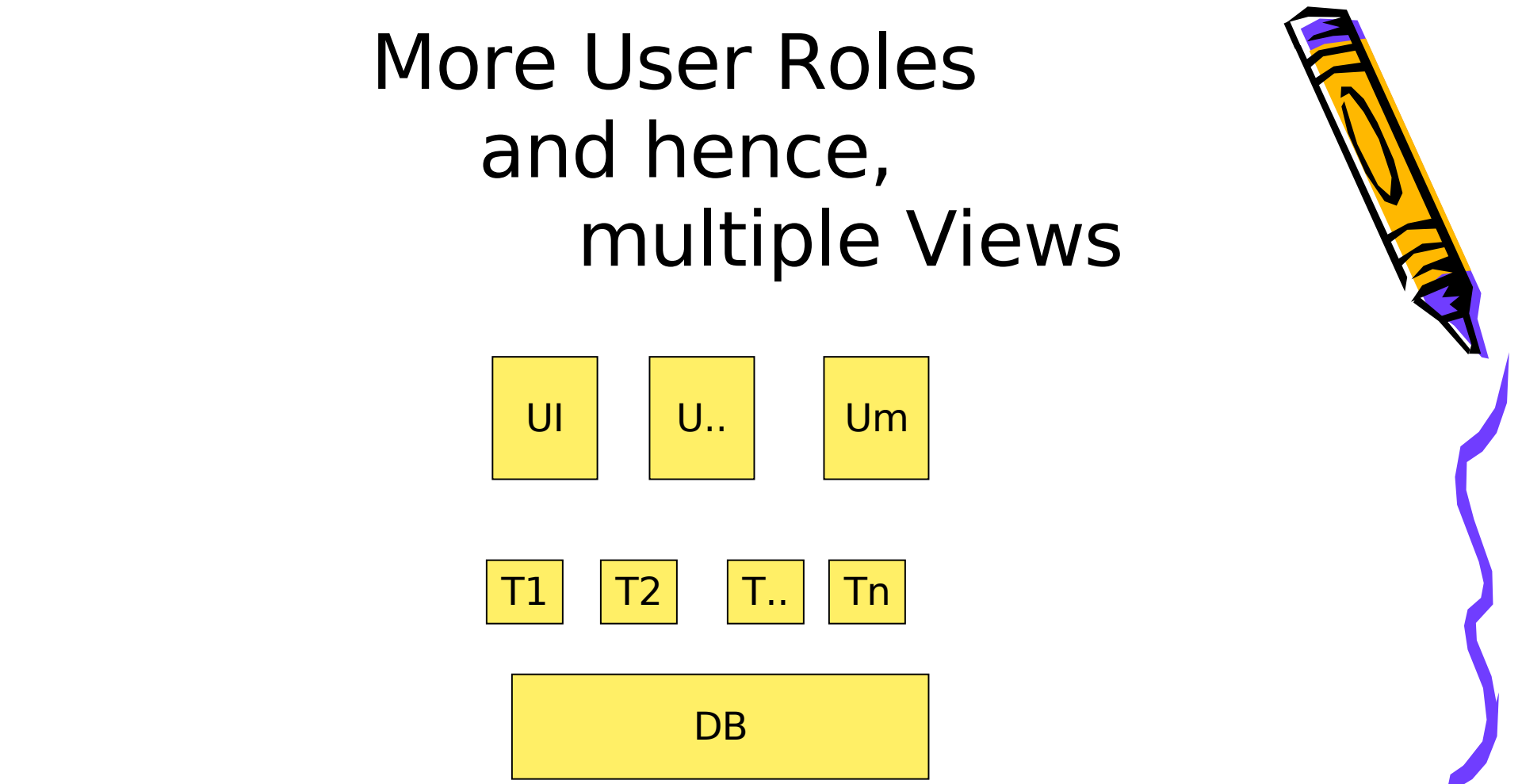
Model View Controller



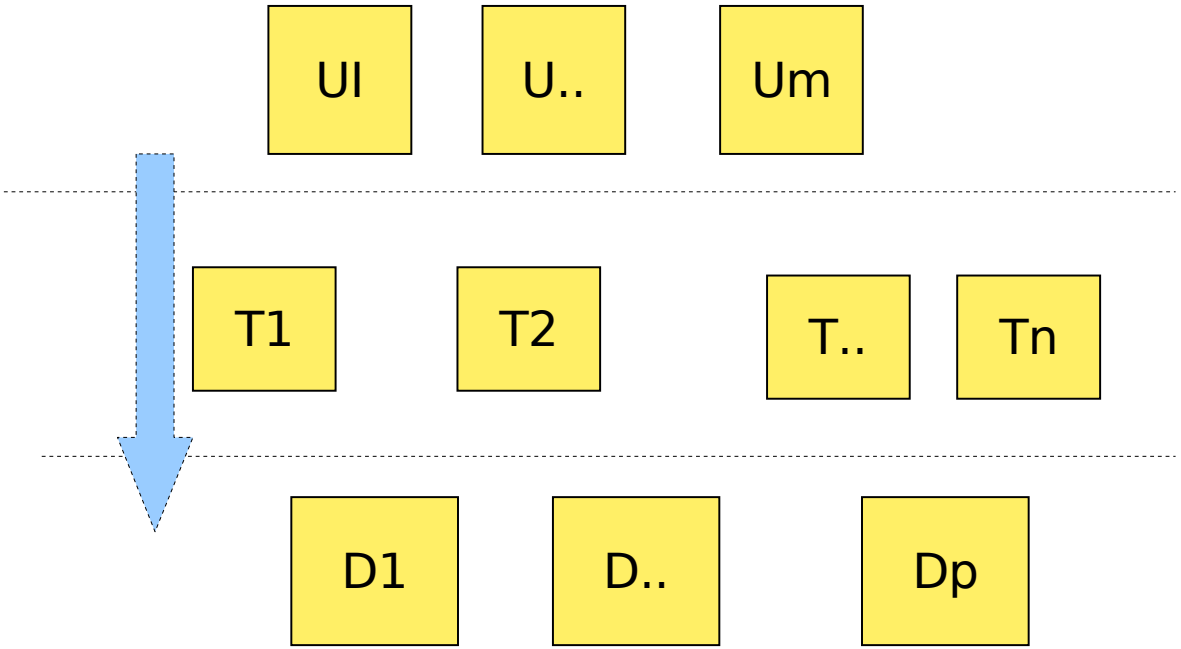
Concurrent Tasks



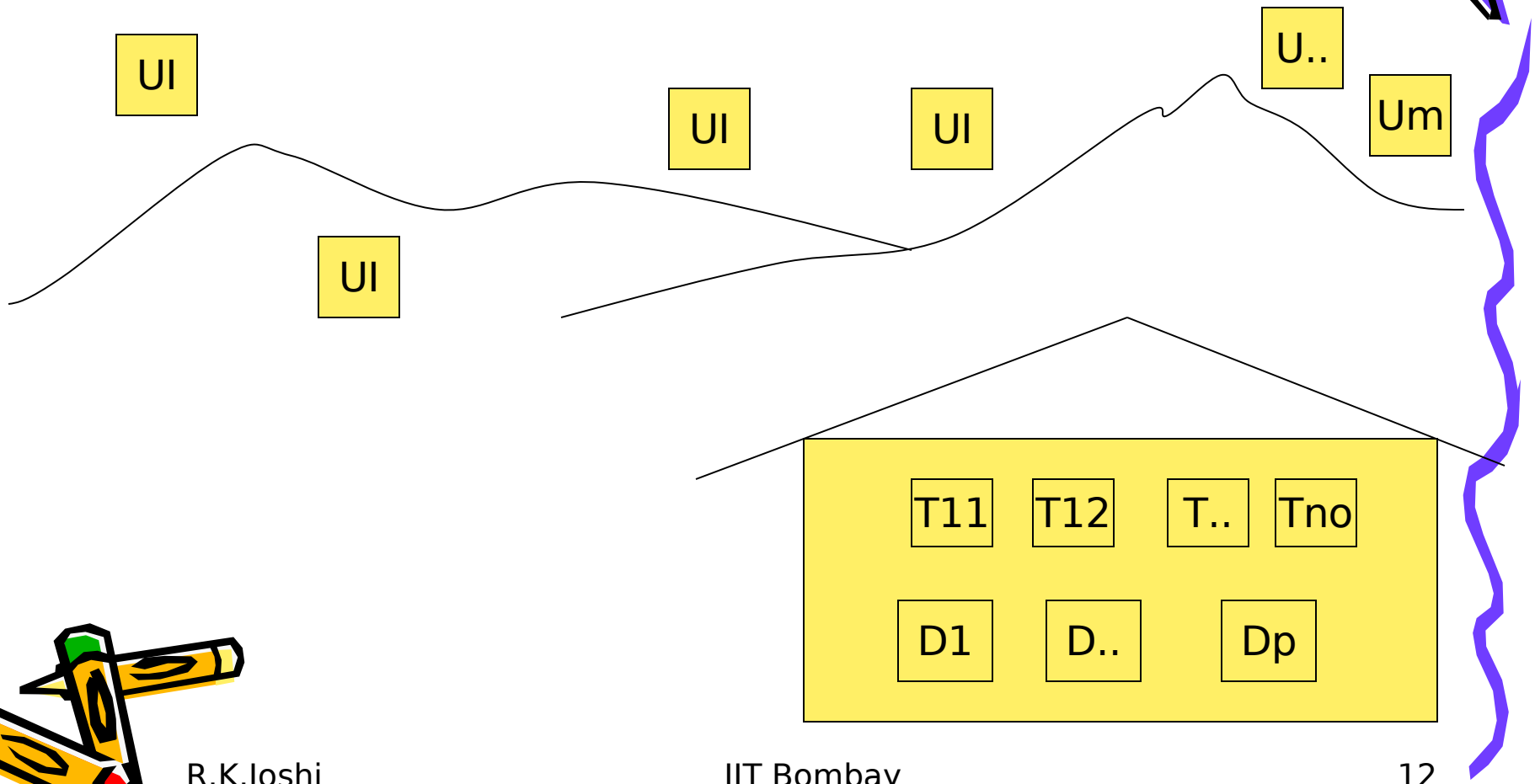
More User Roles and hence, multiple Views



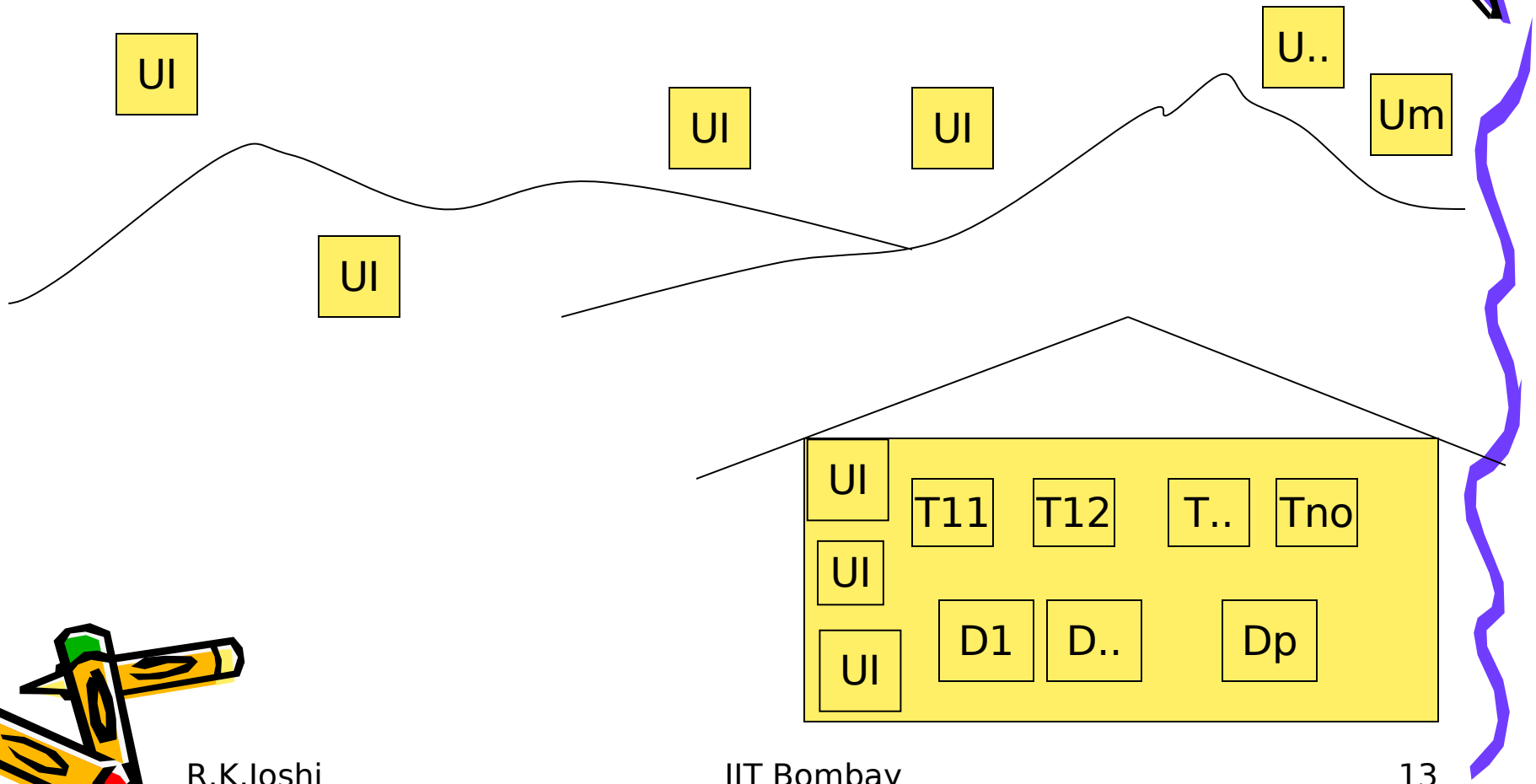
More Data Sites



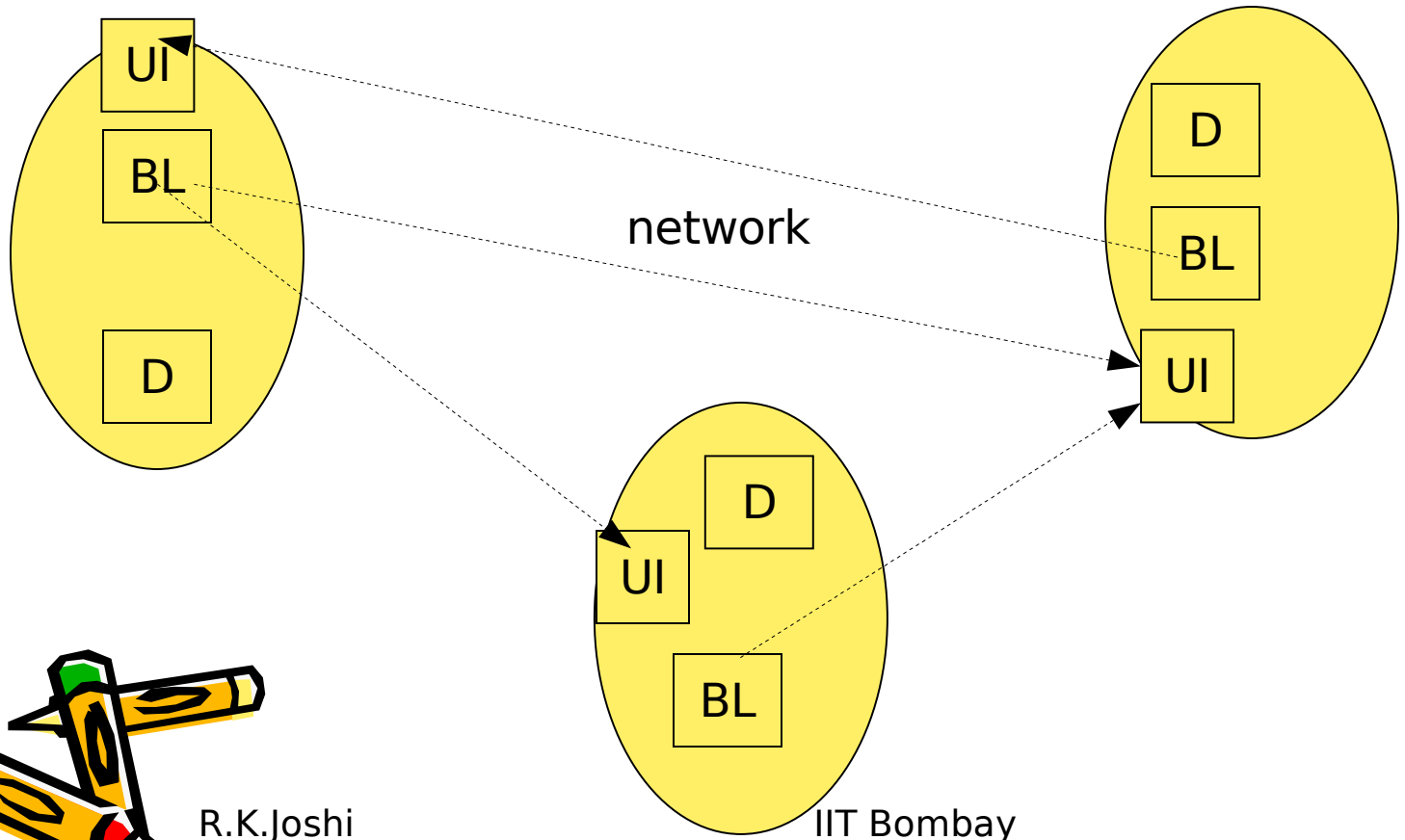
Users are scattered over a wide area



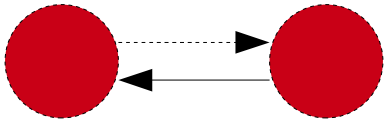
Some users are local



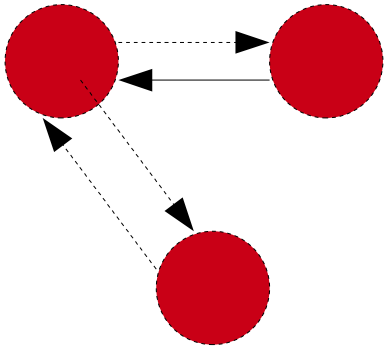
A Peer-Peer Collaboration



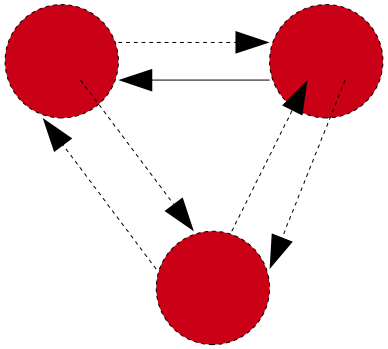
The Concerns of Interoperability



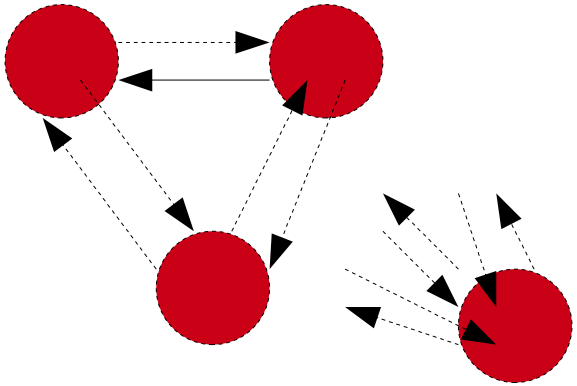
The Concerns of Interoperability



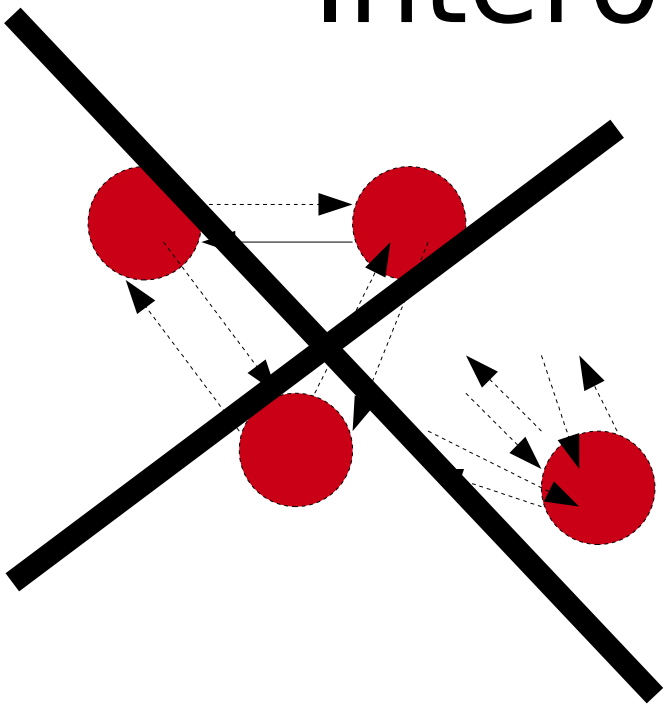
The Concerns of Interoperability

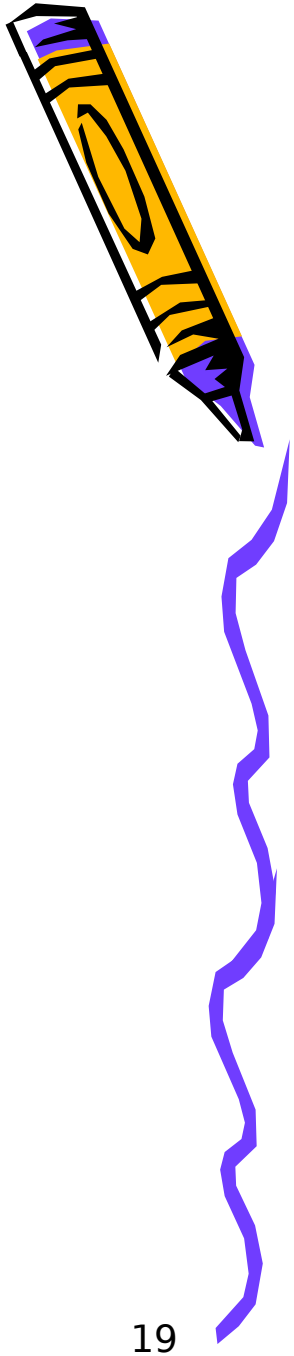


The Concerns of Interoperability

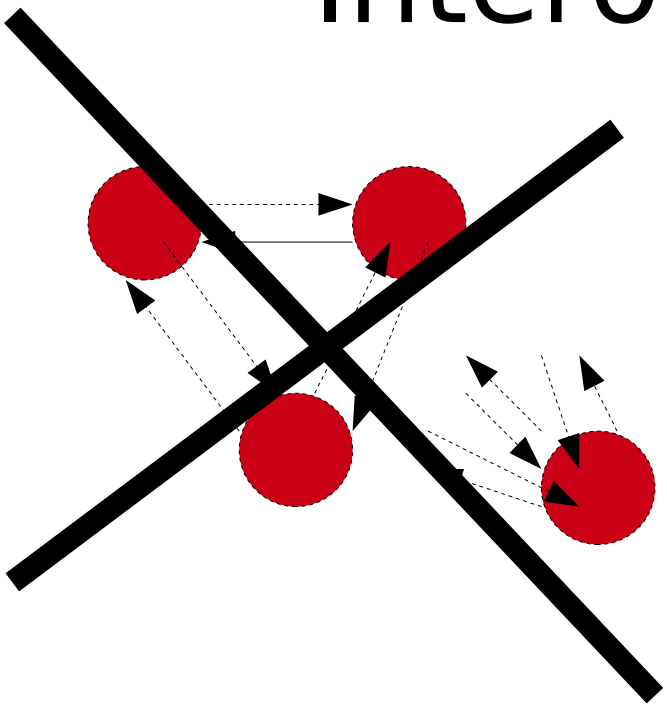


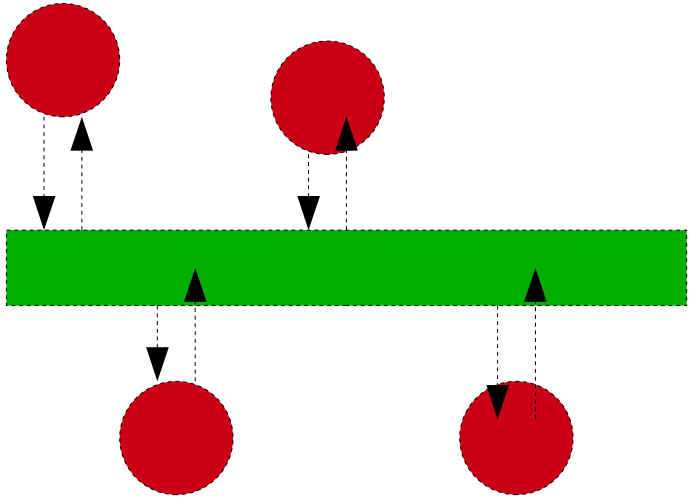
The Concerns of Interoperability



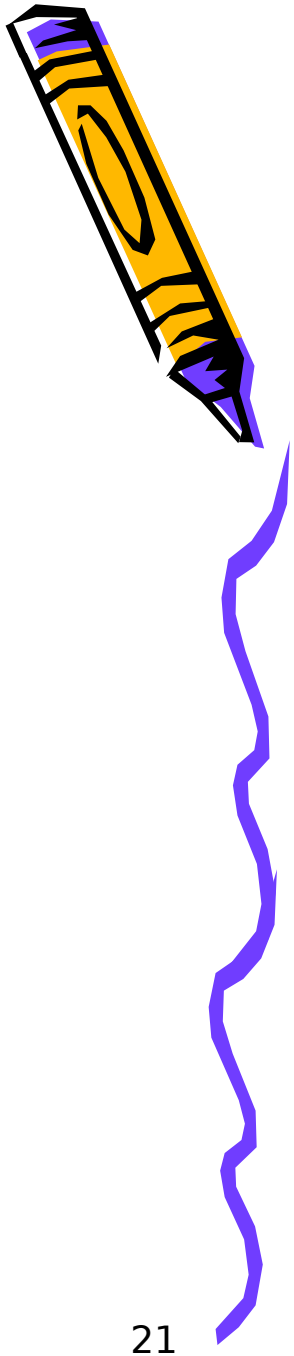


The Concerns of Interoperability





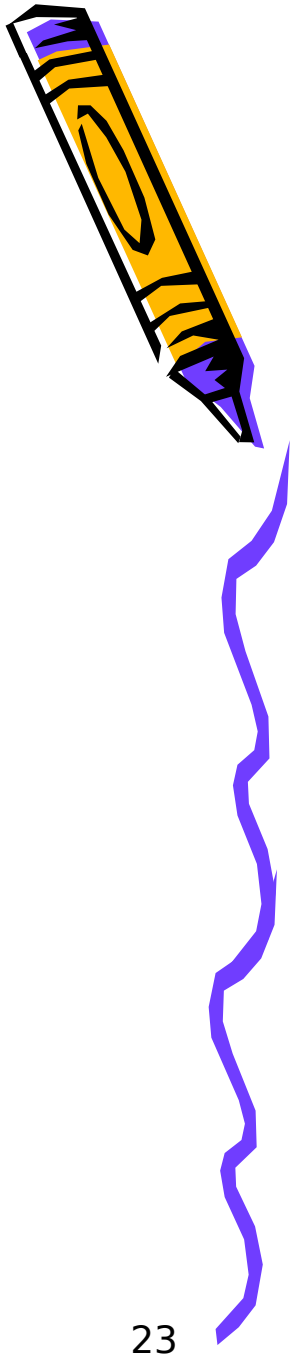
Some Architectural Concerns



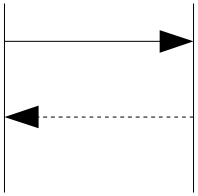
- Business Logic
- Data Design
- Interfaces, Descriptions and Discovery
- Performance and QoS
- Replication and High Availability
- Scalability and Load balancing
- Security, Access Policies, Accounting
- Reusable and Adaptable Applications
- Interoperability and Legacy Integration

Service Orientation

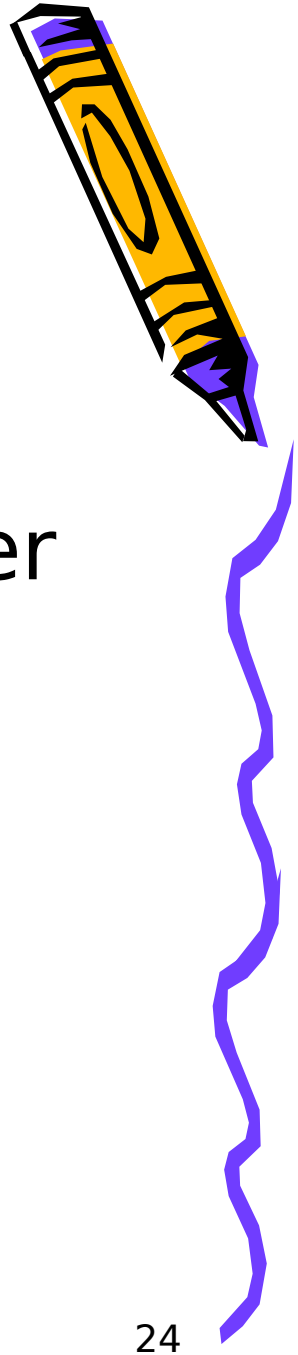
Evolution of Service Orientation



Functions
Remote Procedure Calls
Remote Method Invocations
Interoperable Middleware
Web Services

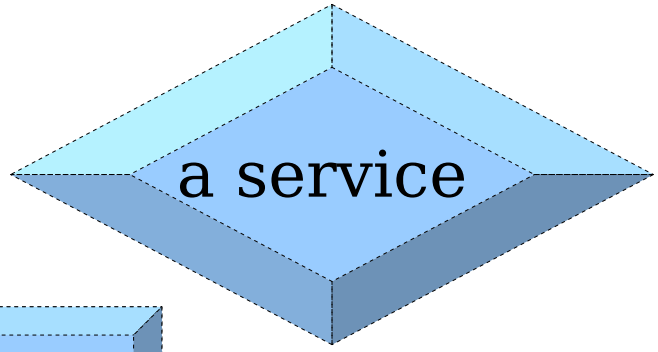


What's a Service?

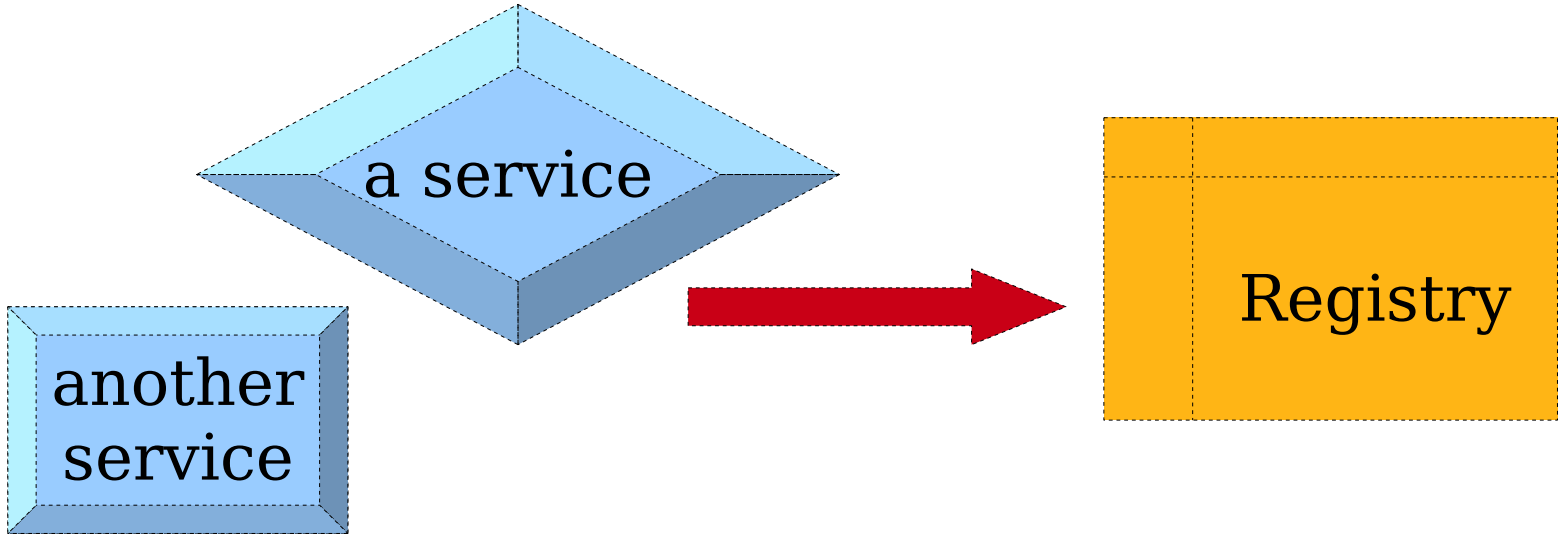


- A program called service user
- A program called service provider
- A protocol throught which they communicate
- Service provider guarantees postconditions
- Service user fulfils preconditions

Publish-Find-Bind/Use

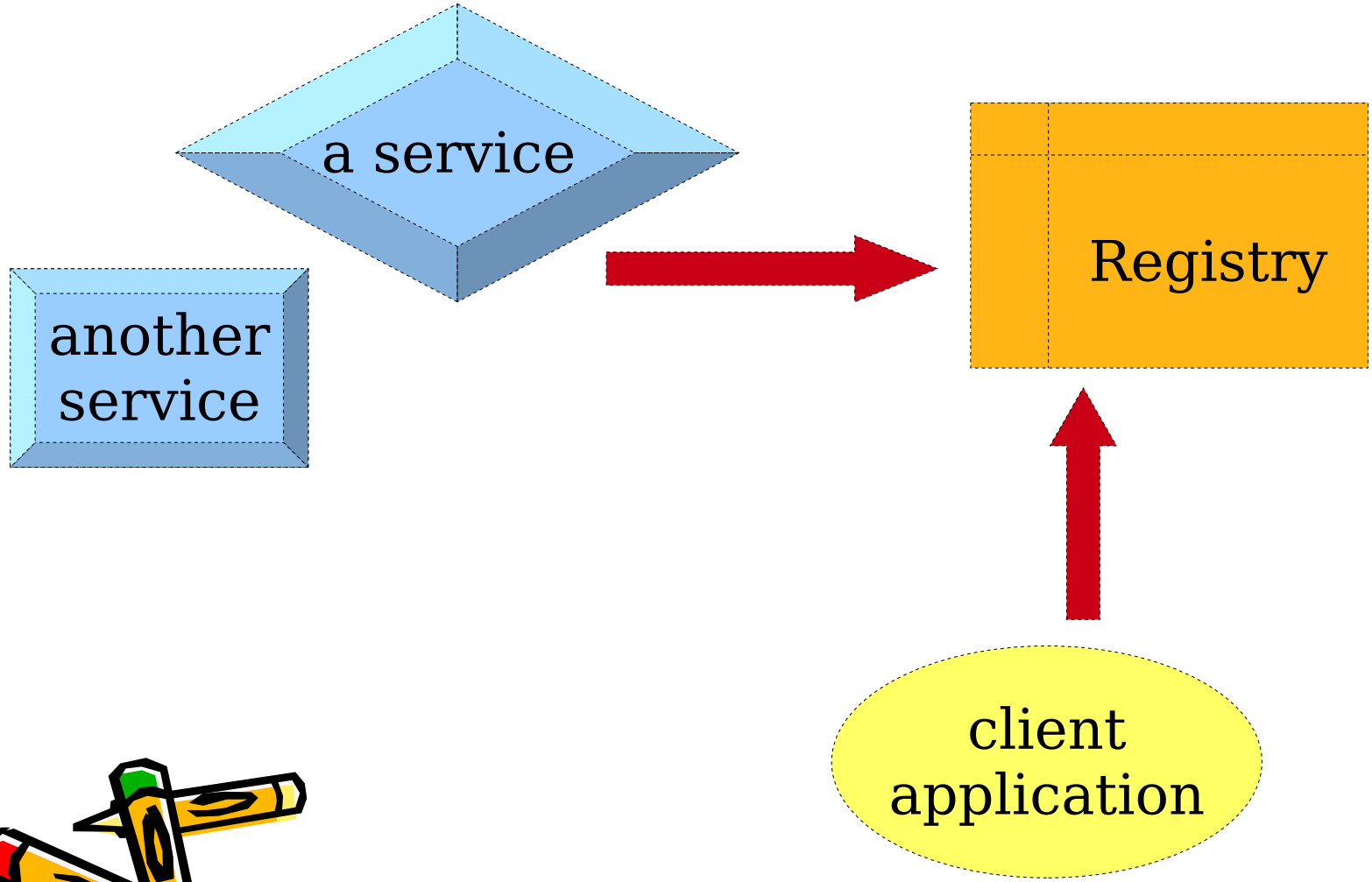


Publish-Find-Bind/Use



client application

Publish-Find-Bind/Use



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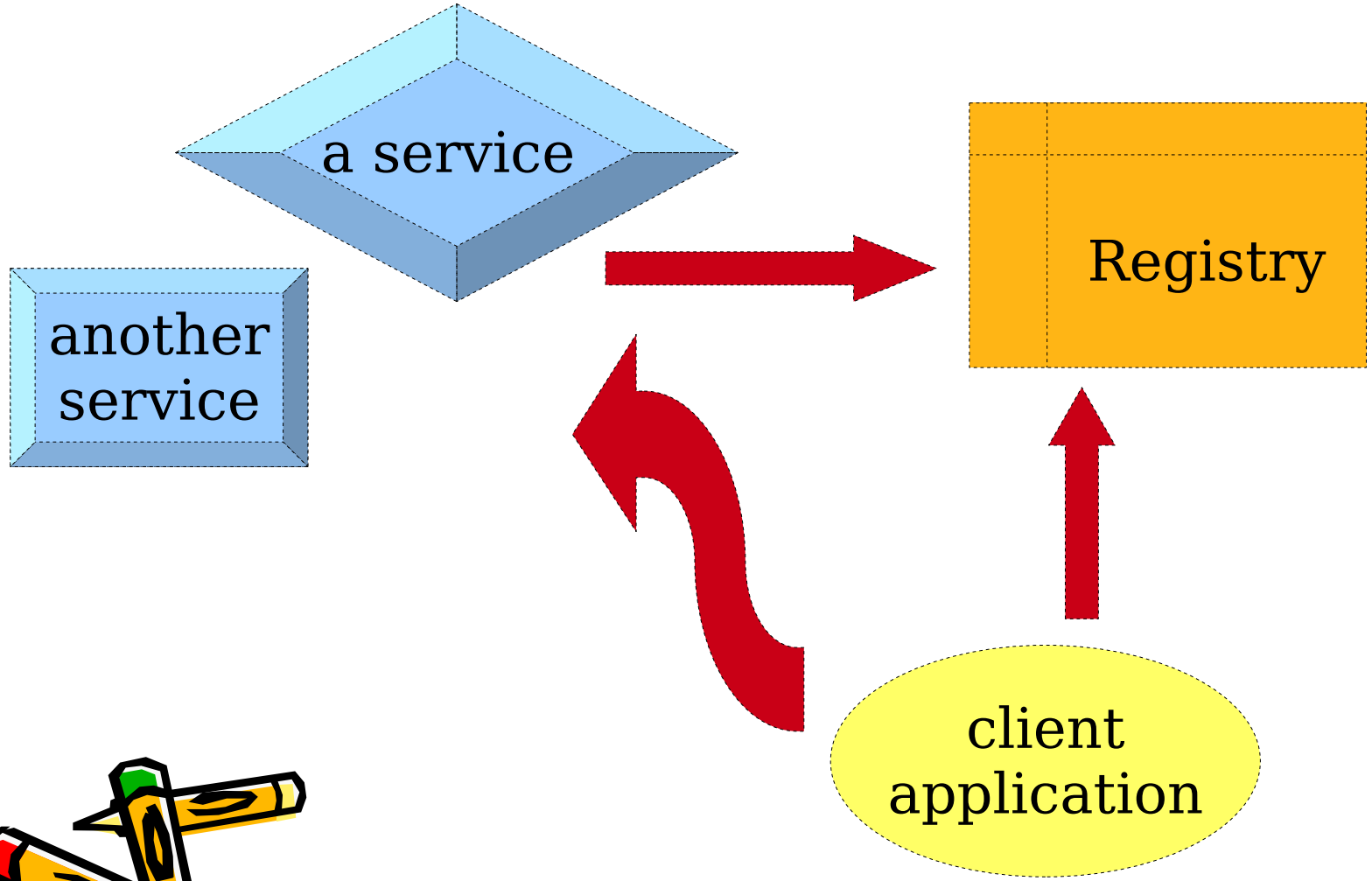
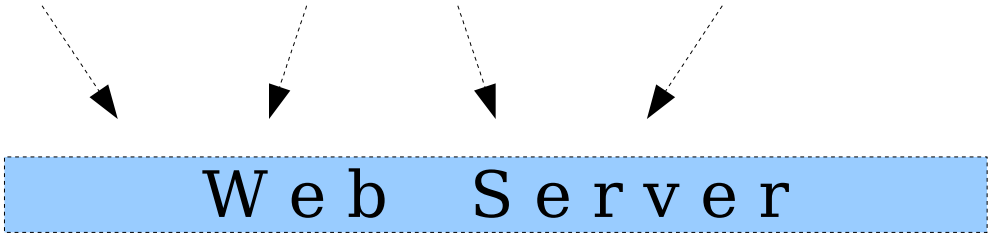


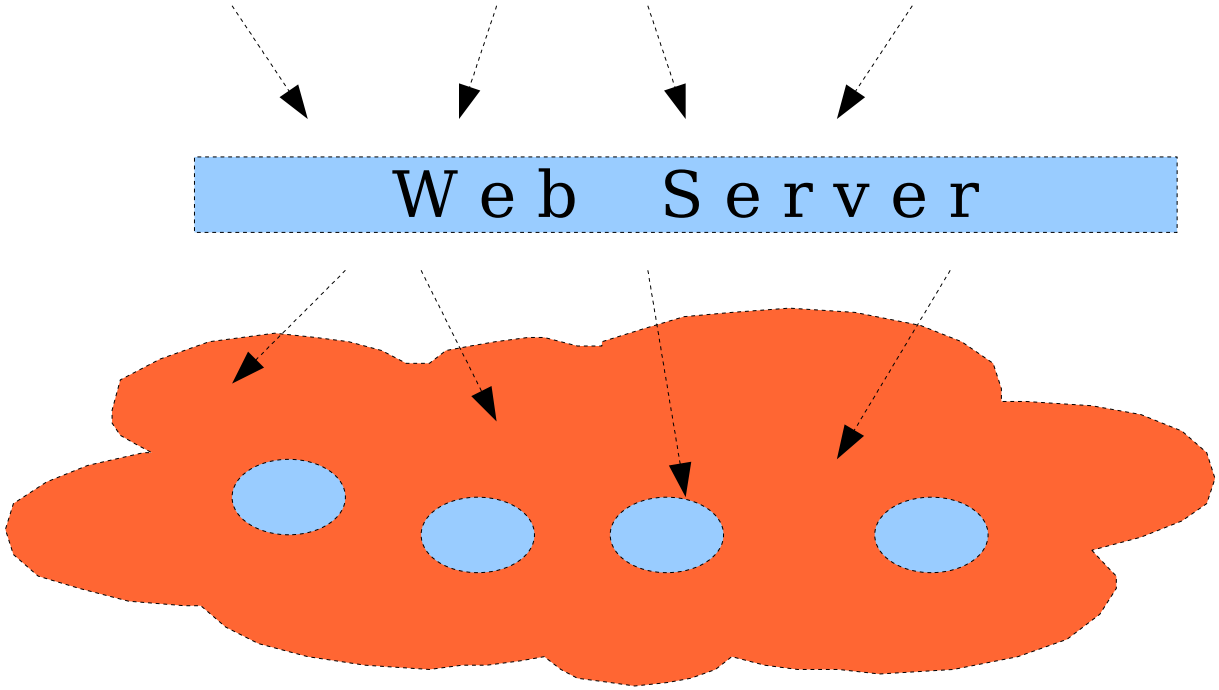
A typical scenario

- Clients ---- download a client-side program and use it (PULL model)
- Server side --- accepts client requests and serve them through local service supports
- Communication and security protocols
- Traditional computational layering techniques at server side
  - Service dispatch, parallelism, database layer
  - Firewalls, filters, loggers
- Service descriptions and discovery

Cluster Computing/Grid Backbone



Cluster Computing/Grid Backbone



Some Internet Programming Techniques

- Applets – code that gets downloaded with an html page
- XML-based standards for communication and data representation
- Forms, Scripts, Servlets..
- SOAP (simple object access protocol)
- Self Description (eg WSDL)
- Programs can discover programs (UDDI) – universal description, discovery and integration

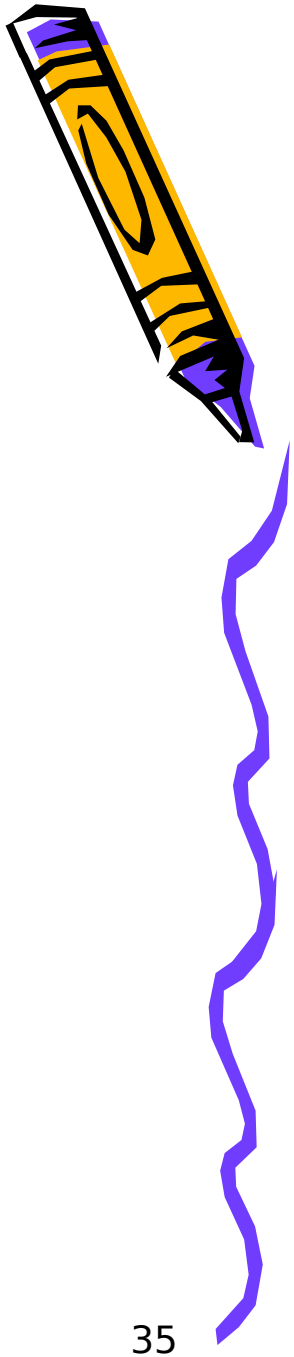
Event-Driven Architecture

- Events are a major abstraction in the domain
- Events occur as a result of something changing within the system
- Some applications are interested in some specific events

Parameters

- Event sources, called publishers
- Event subscribers, or event handlers
- Event types
- Event priorities and Service guarantees
- Event Buffers, Event spaces

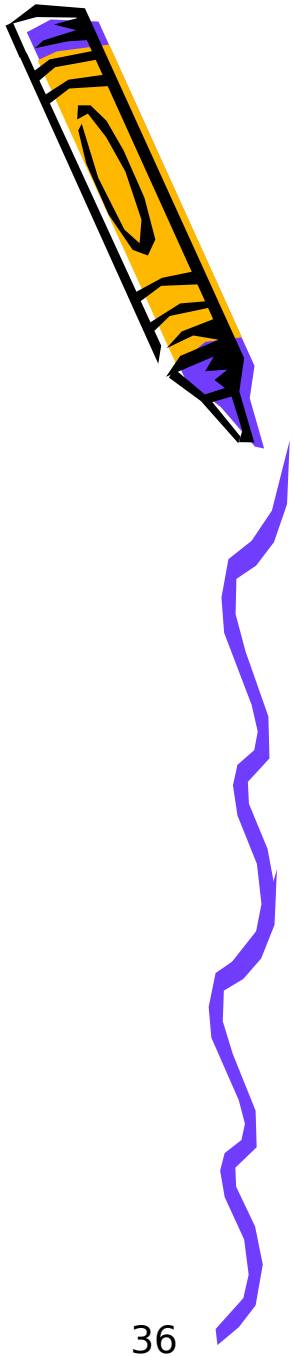
Event Publishing



Push type publishers

Pull type publishers

Event Delivery



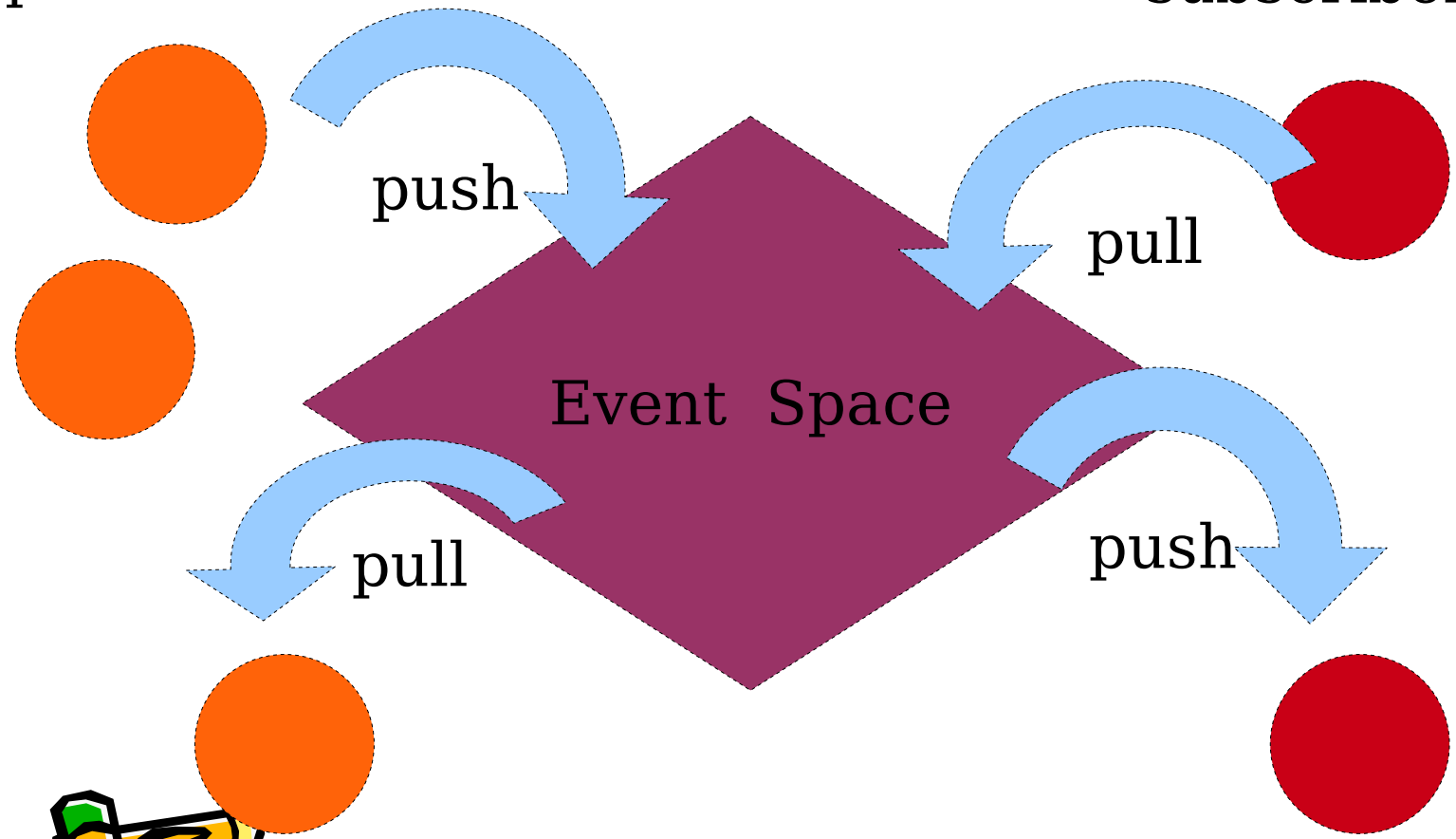
Pull type subscribers

Push type subscribers

Event Spaces

- Remeber events for pull subscribers
- Pull events from pull publishers
- Push events onto push subscribers
- Receive events from push publishers

An EDA

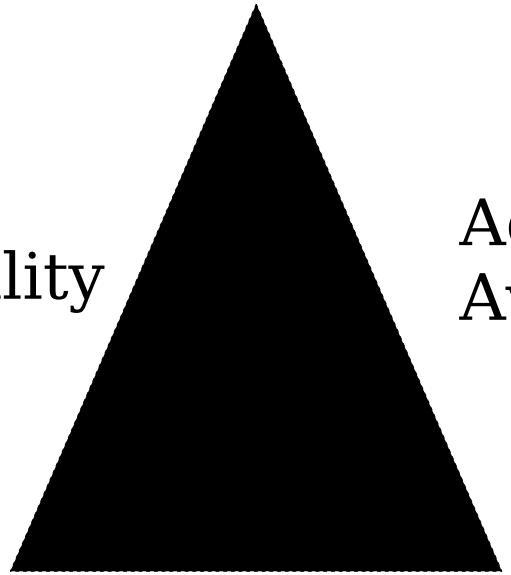


EDA and SOA

- SOA is about thinking in terms of well-defined services, contracts, protocols and interoperability
- EDA is about having to handle events in an event-major system
- The components in EDA could be services themselves

Interoperability and Availability Issues

System already in place, and it's working



Address interoperability

Address Availability

standardization

New Applications, Extensions