Lecture 1

Introduction to 5COSC004W Client-Server Architecture

UoW ML
Dr. Gabriele Pierantoni
20.01.2021

Content of Today's Lecture

- Introduction

- Course Outline
- Introduction to Client/Server Architecture

Module Team

CAS - Mr. Cassim Farook
RAJ - Mr. Rajitha Jayasinghe
PRA - Mr. Prasan Yapa

SRY - Mr. Sriyan Fernando
IRB - Mr. Iresh Bandara
SLR - Ms. Sulari Fernando
MRH - Mr. Murshid Hassen
NIS - Mr. Nisal Sudila

X3,X4,X5,X6 - TBA

Asynchronous Teaching – Tutorials

- Useful for:
  - Ask questions about the technical material
  - Practice exercises and writing code
- But no substitute for:
  - Learning material and Synchronous Q&A sessions

Lecture & Tutorial Arrangements

- Semester long module
- 20 UK credits
- 2 hour Q&A Synchronous Session each week

- 2 hour Synchronous Tutorial each week
  - See your timetable to find out when and where

Assessment – Theory In Class Test

- One In-Class tests
  - Closed Book
  - 40% of the module
  - Passing mark: 30%

  - Test will take place in your normal tutorial slot
  - Test will be sit on blackboard
  - There will be mock-up tests that will gently lead you to the test

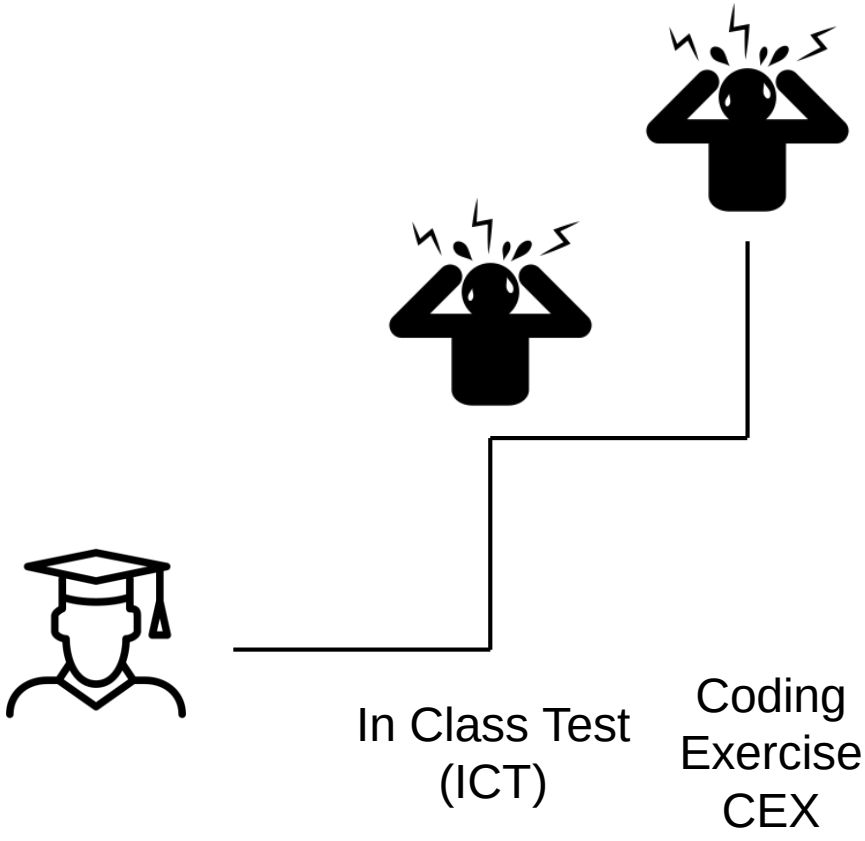
Assessment – Coding Tests

- Two In-Class Coding Exercises
  - Closed Book
  - 60% of the module total
  - Passing mark: 30%

  - Coding Exercise will take place in your normal tutorial slot
  - Coding Exercise will be sit on blackboard
  - Coding Exercise will be held at the end of term
  - There will be mock-up exercises during the tutorials that will gently lead you to the exercise

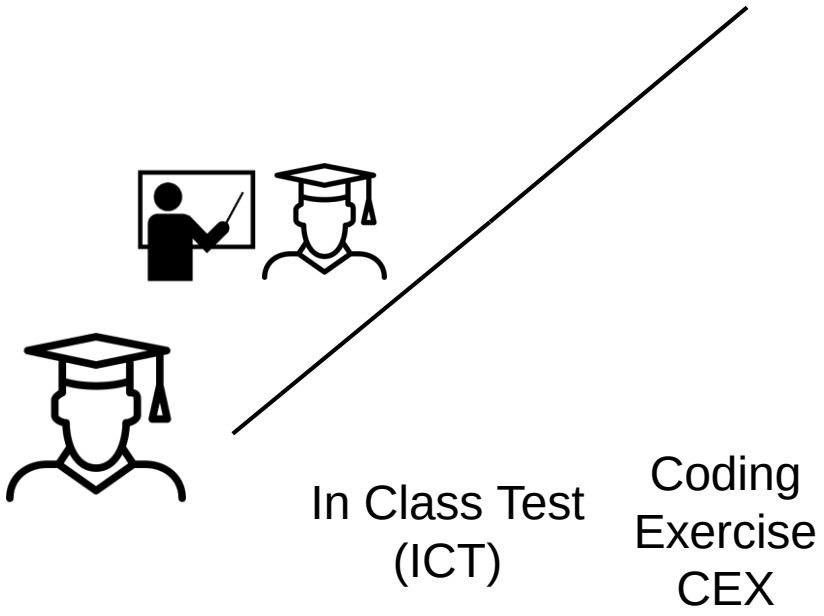
Passing the module

The Hard Way



Pain and misery, poor results

The Easy Way



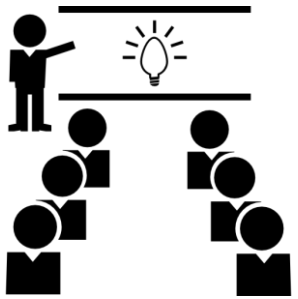
Less pain and misery, better results

How to pass 1/3 –Engage

- Read all the learning material
- Attend all Synchronous Q&A Sessions
- Attend all tutorials
- Do all tutorials as they are released
  - Ask for help at tutorials
- Read recommended further reading
- **Ask if you struggling**
- **Help your colleagues if they ask for help**
- Use your Personal Tutor
- **Try the mock-up tests**

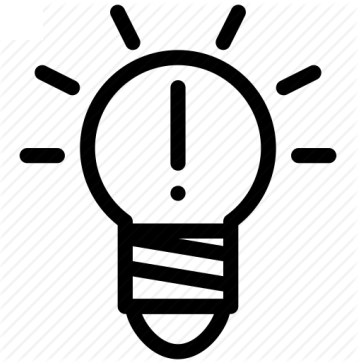
How to pass 2/3 - Engage

- Engage with your lecture team and your fellow students



- Engage with the tools

- Engage with the concepts to build a mental model.

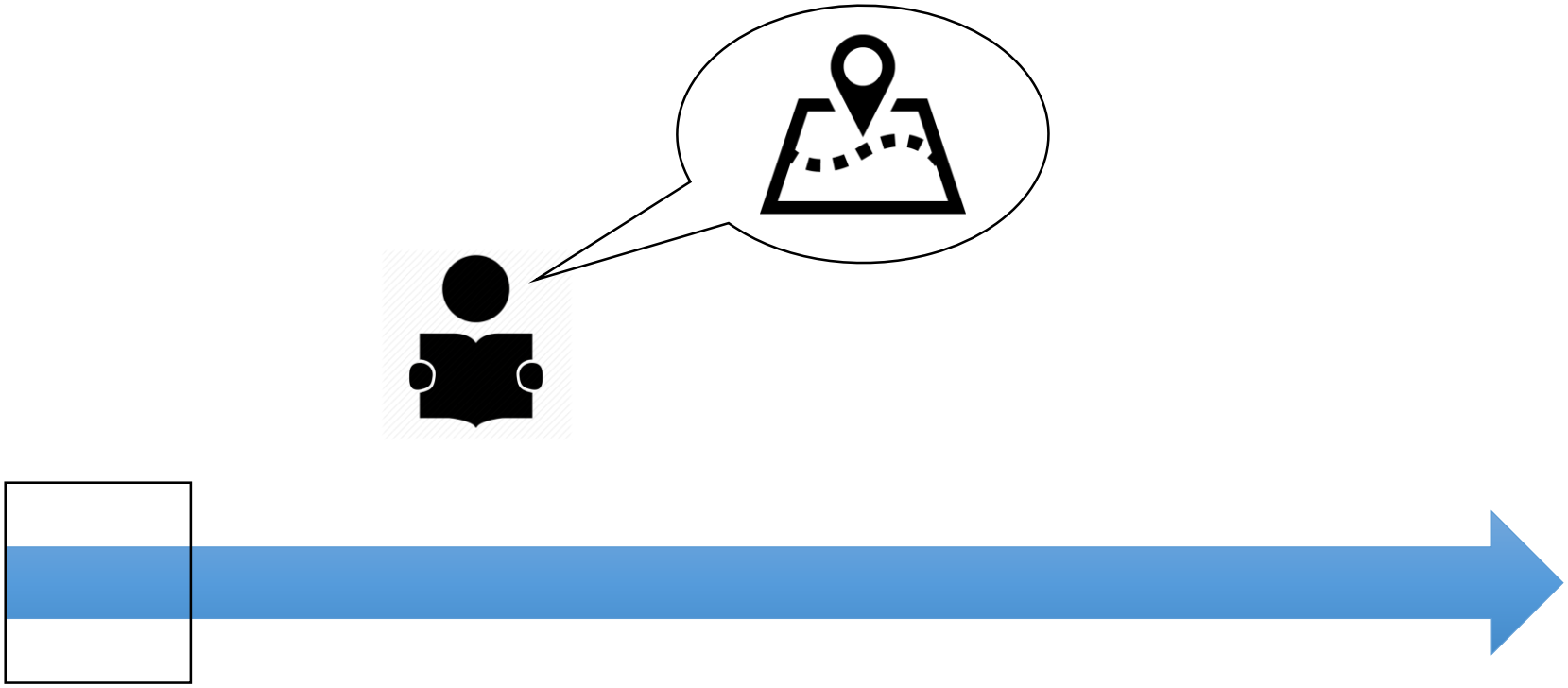


How to pass 3/3 - Challenge

- At each step you reach, congratulate yourself for a job well done !
- Then ask yourself if there is more you would like to learn and that we can teach you ?

- Learn more, challenge yourself and the team !
- Then congratulate yourself again for a job well done !

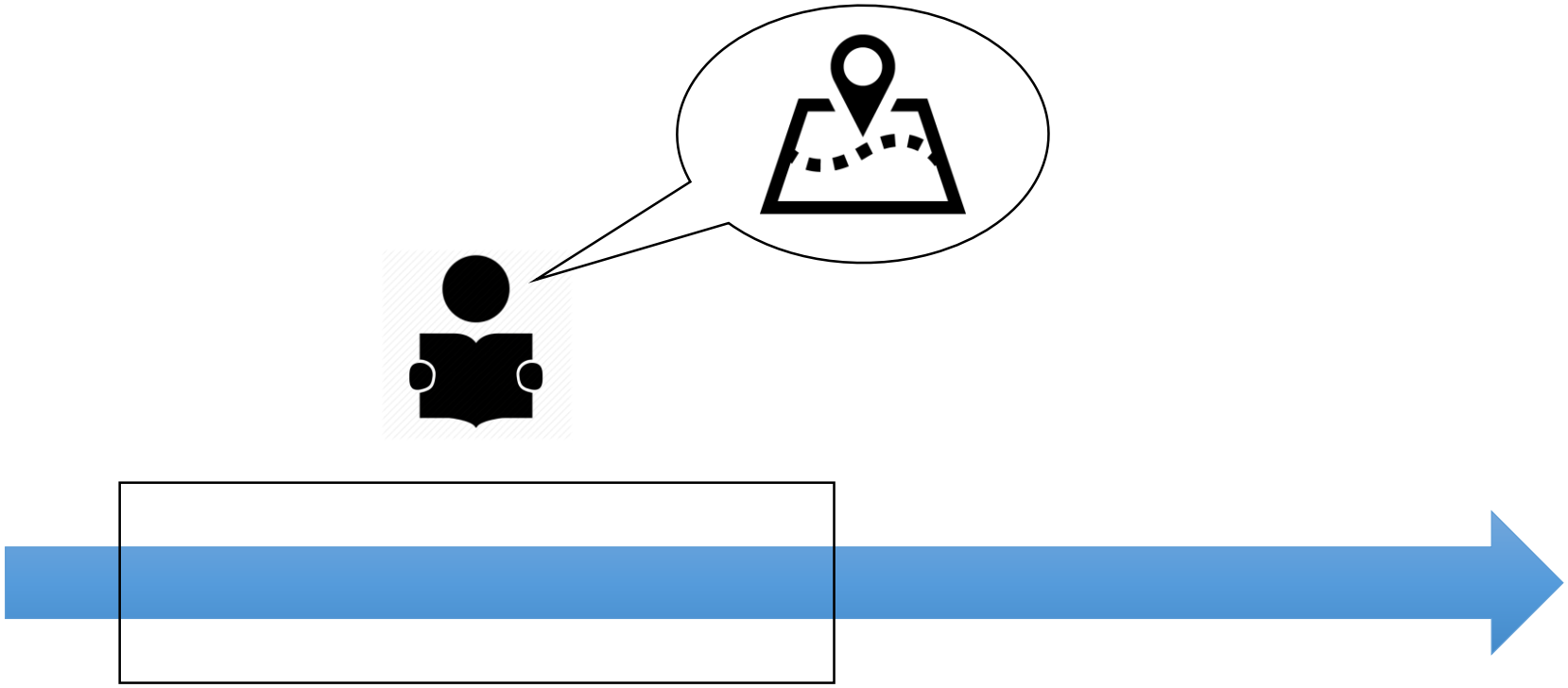
Introduction (Where are we ?)



First week:

- Introduction to Course
- Introduction to Client/Server

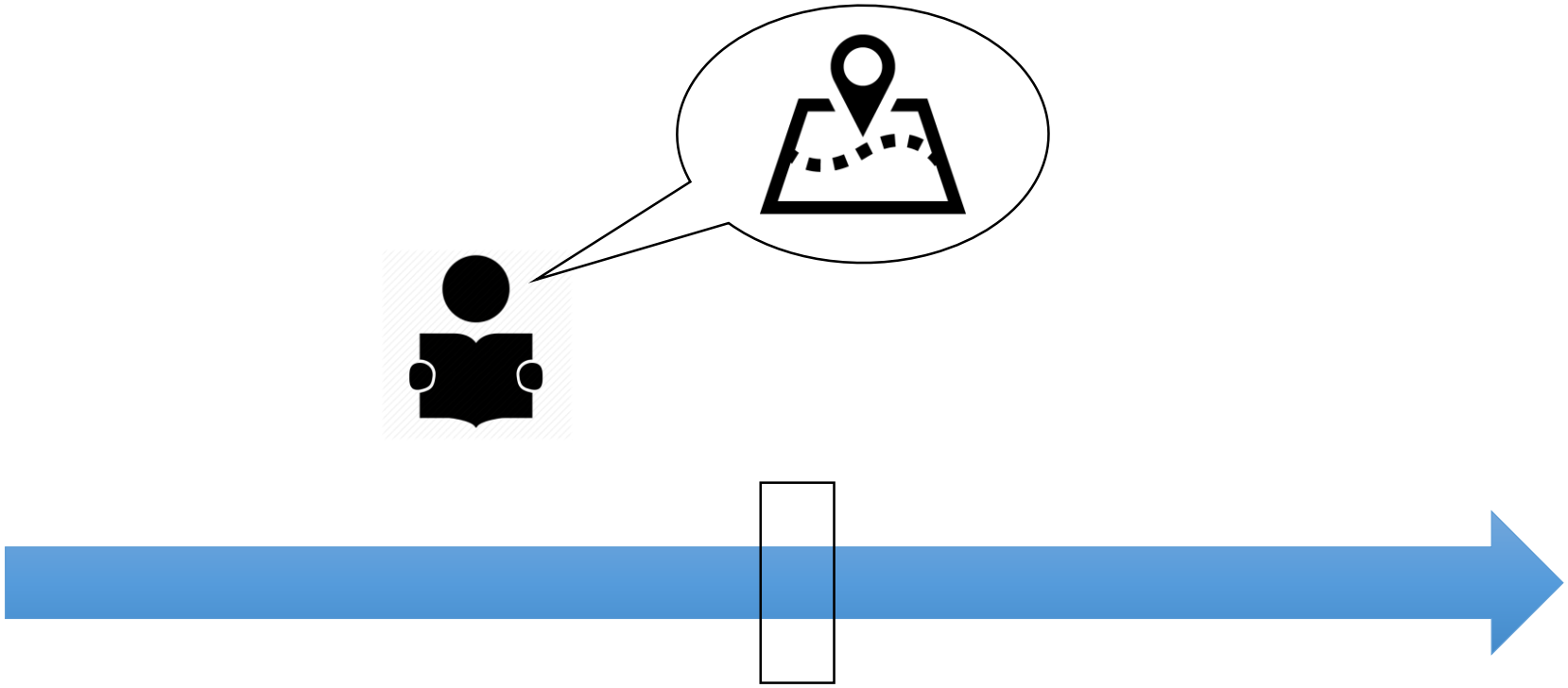
Introduction (Where are we going ?)



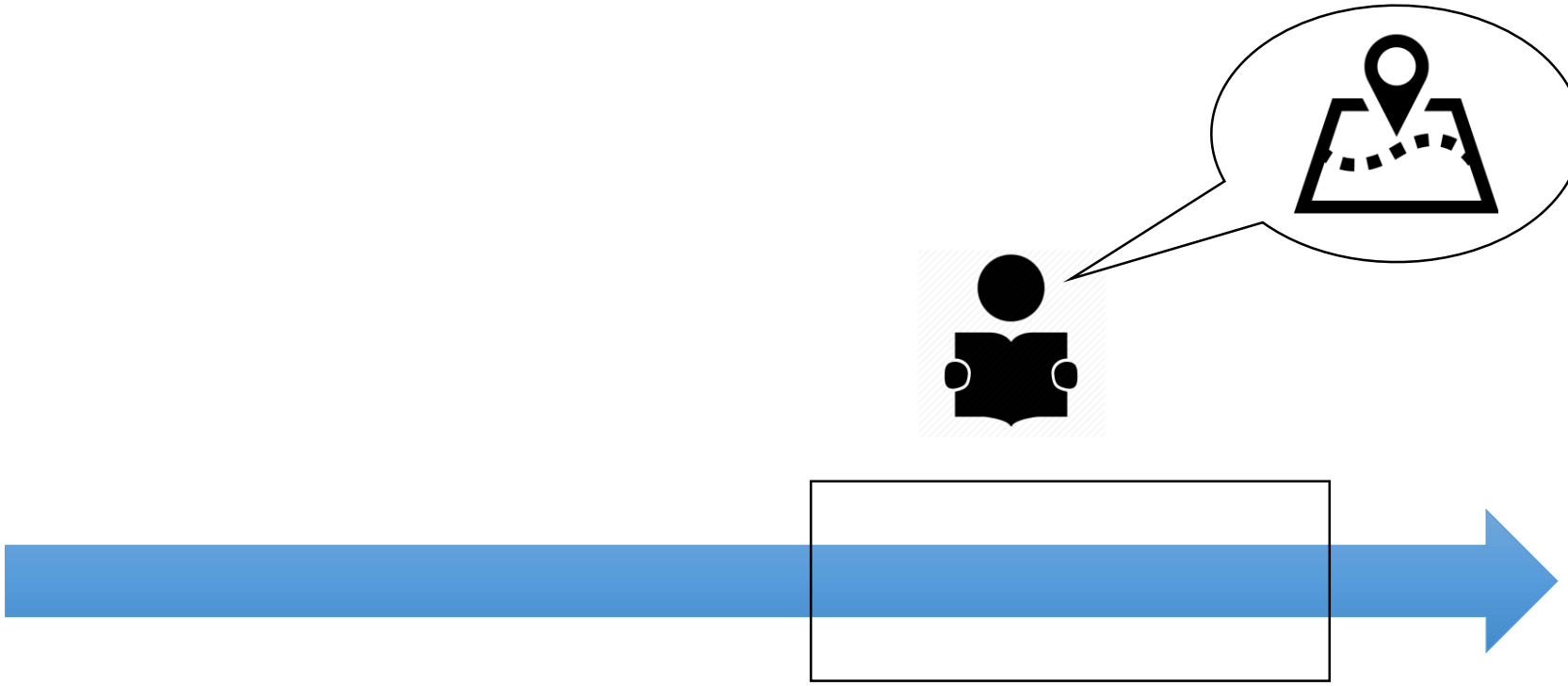
Next five weeks:

- Networking
- Theory

Introduction (Where are we going ?)



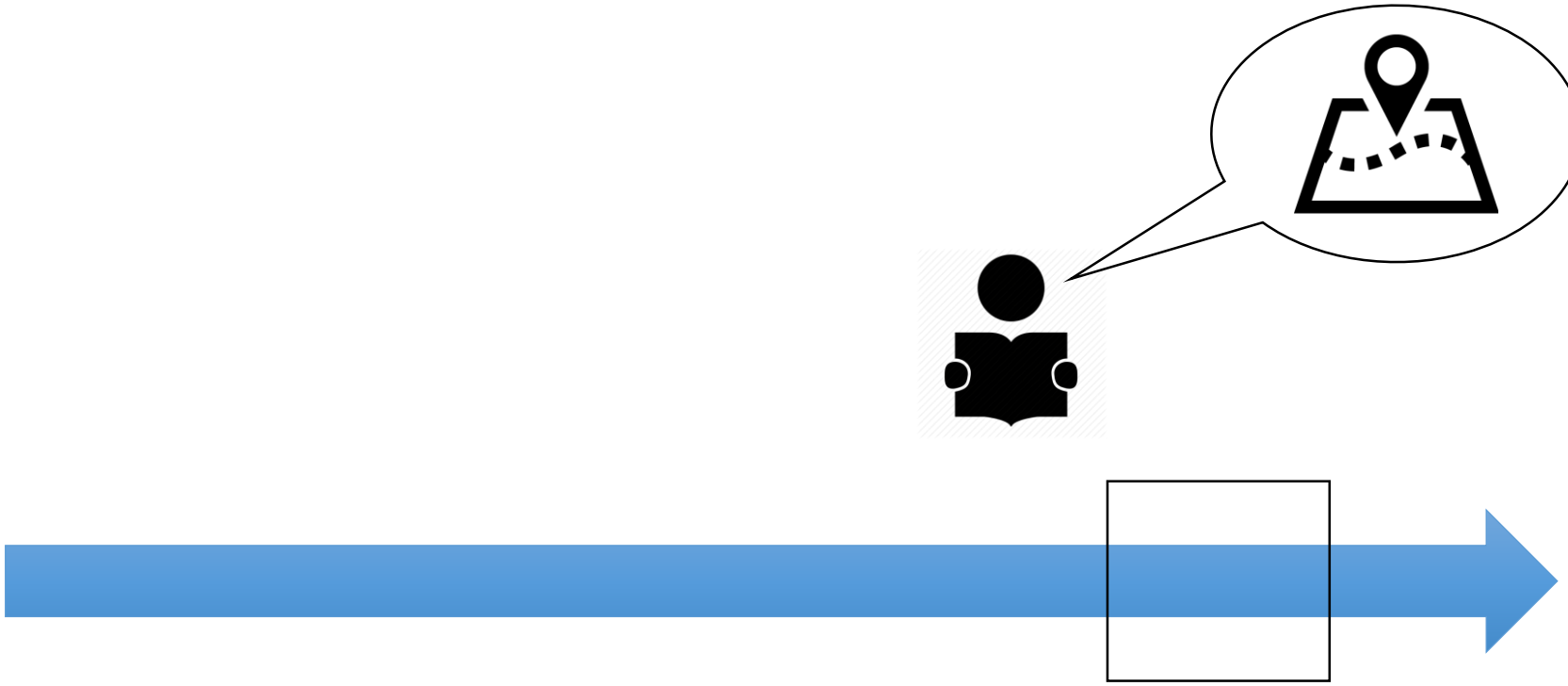
Introduction (Where are we going ?)



Last six weeks:

- Architecture and Technologies

Introduction (Where are we going ?)



Last two weeks:

- Coding Exercises

5COSC004W Topics 1/6

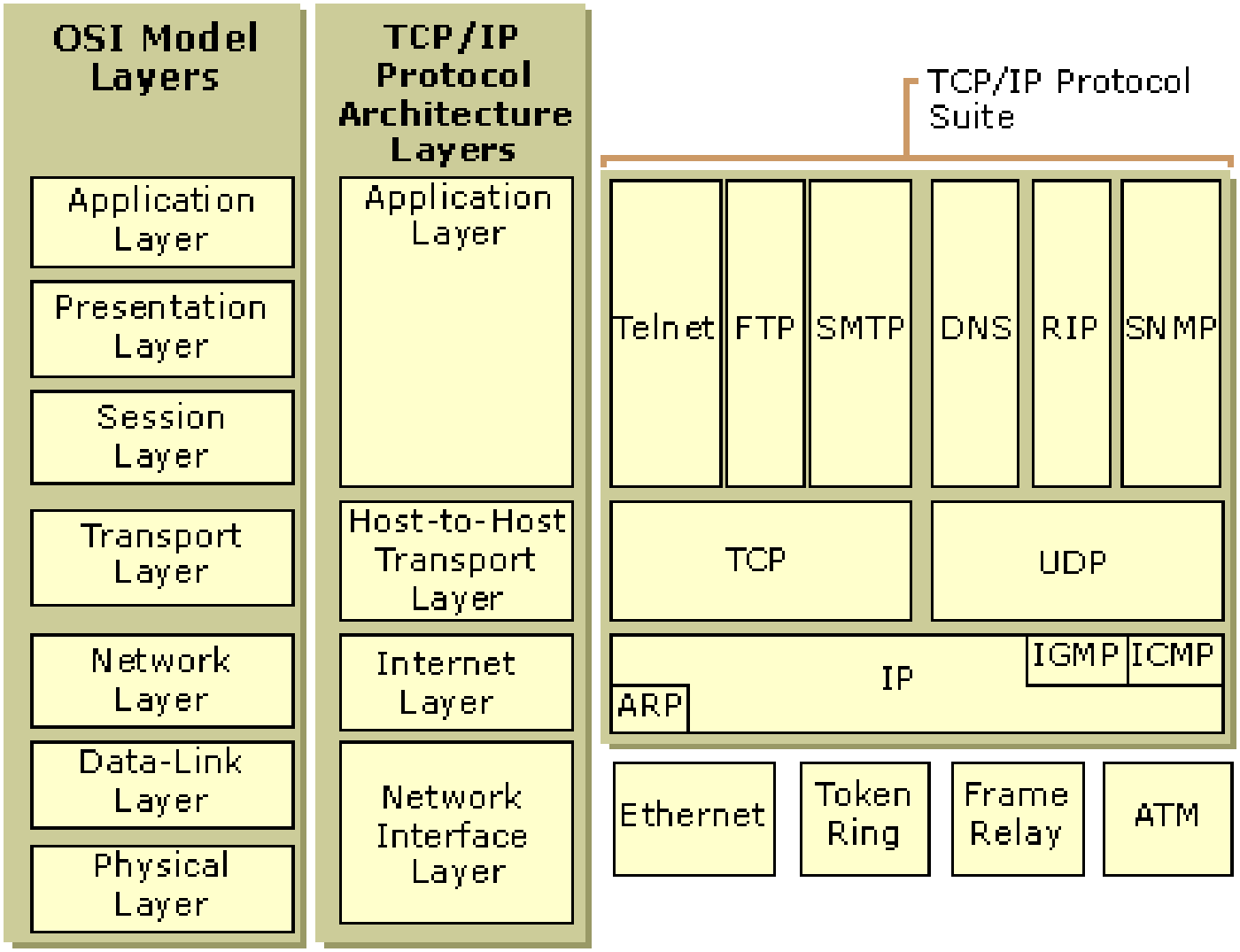
- **Introduction (Today)**

- **Internet**: computer network, network architectures (Intranet/Internet/Extranet), TCP/IP and ISO OSI model and software layers, Internet access, addressing and naming: access methods, addressing (IPv4 vs IPv6, address translation, name lookup, DNS) and networking approaches (circuit, packet and message switching)

5COSC004W Topics 2/6

- **Internet protocols and standards**: transport layer (TCP + UDP), network layer (IP - virtual circuits vs. datagrams, routing - broadcast and multicast routing -), and data link layer (error detection and correction, multiple access protocols, addressing), application layer (web and HTTP, ftp, mail);Internet components: servers (caching, mail, name, proxy and web servers), routers, switches,
- **World Wide Web**: architecture, components (clients, proxies, servers), protocols and standards (URI, URL, HTML and HTTP); application areas: e-commerce, education, entertainment, portals, social media; applications: email, SMTP,POP3, IMAP & webmail, file transfer (FTP), remote login (ssh, telnet) www (HTTP and HTTPS)

Models and Protocols



5COSC004W Topics 3/6

- **Distributed Systems**: architecture (client-server, peer-to-peer, brokered architectural models, multiprocessor vs. networked systems; distributed operating systems: local and global states, communication primitives, concurrency, processes and threads, distributed objects and remote invocation, synchronisation (logical vs physical time, clocks vs and logical clocks),

5COSC004W Topics 4/6

- **Distributed Resource Management**: distributed scheduling (replication, transactions and concurrency control, two- and three-phase commit, ACID/BASE models, mutual exclusion, deadlock, coordination and agreement and multi-cast, distributed shared memory, distributed file systems and databases (architecture, mechanisms)

5COSC004W Topics 5/6

- **Client-Server Architecture**: client-server architectures (two-, three- and multi-tier systems), centralized vs distributed architecture, components (clients, servers and network), server provisioning (local and external)

- **Client-Server Communication**: sockets (socket API and programming) remote access (Remote Procedure Call and Remote Method Invocation)

- **SOA and Web Services**: SOA (components and reference and operational model) SOA and Web Services

5COSC004W Topics 6/6

- **Web service protocols**: XML, SOAP, WSDL and UDDI

- **Web service design and implementation**: web client types, web clients and web services design and coding using JAX-WS and JAX-RS

- **RESTful web services**: Representational State Transfer (REST), REST concept, REST architecture (data connector, and process view), REST uniform interfaces and HTTP requests, REST vs SOAP