

University of Beira Interior

Distributed Systems – 11571 – Informatics Engineering

PROGRAM:

1 – Characterization of distributed systems

- 1.1 – Introduction
- 1.2 – Examples of distributed systems
- 1.3 – Challenges

2 – Models of distributed programming

- 2.1 – Shared memory systems versus distributed memory systems
- 2.2 – Message passing models
 - 2.2.1 – Synchronous communication
 - 2.2.2 – Asynchronous communication
 - 2.2.3 – Remote procedure call
 - 2.2.4 – Ways of create and identify processes
- 2.3 – Architectural models
 - 2.3.1 – Client-server model
 - 2.3.2 – Multiple servers
 - 2.3.3 – Proxies
 - 2.3.4 – Peer processes
- 2.4 – Fundamental Models
 - 2.4.1 – Interaction model
 - 2.4.2 – Failure model
 - 2.4.3 – Security model

3 – Interprocess communication

- 3.1 – TCP and TCP Sockets
- 3.2 – External data representation and marshaling
- 3.3 – Client-server communication
 - 3.3.1 – The request-reply protocol
 - 3.3.2 – Failure model of the request-reply protocol

4 – Concurrent programming (in Java)

- 4.1 – State diagram of a thread
- 4.2 – Thread synchronization
- 4.3 – Multi-threaded servers

5 – Distributed objects and remote invocation

- 5.1 – The distributed object model
- 5.2 – Remote method invocation (RMI)
 - 5.2.1 – RMI invocation semantics
 - 5.2.2 – Implementation of RMI
- 5.3 – Java RMI case study
- 5.4 – CORBA

6 – Time and global state

- 6.1 - Clock synchronization
- 6.2 – Sorting and logical clocks

7 – Web programming in javaEE

Bibliografy

[Coulouris2005] “Distributed Systems: Concepts and Design”, 5th edition, George Coulouris, Jean Dollimore and Tim Kinderg, Addison-Wesley, 2011.

[Boger01] “Java in Distributed Systems: Concurrency, Distribution and Persistence”
by Marko Boger, Publisher: Wiley & Sons; ISBN: 0471498386; 1st edition (May 2001)

[Pitt2001] Java RMI, The Remote Method Invocation Guide, Esmond Pitt, Kathleen McNiff,
Addison-Wesley, 2001.

Assessment

a) – Two written tests

T1 – April 5th, 11:00 O'clock ----- 6 points

T2 – June, 2nd, 16:00 O'clock ----- 6 points

b) – Two projects (in group)

P1 – Distributed Objects ----- 4 points

- Theme is publish on March 20th
- Send the code by mail until April 27th.
- Discuss the project on May 4th

P2 – Web application in Java EE ----- 4 points

- Theme is publish on May 8th
- Send the code by mail until June 6th
- Discuss the project on June 8th and 9th

Conditions to obtain approval:

- Attend to 12 lab classes, at least.
- Obtain $T1 + T2 + P1 + P2 \geq 9.5$

Exam ----12 points (it will replace t1 + t2).