

2007 Coursework for ITO.12 - ICT Module

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Note: As preparation for this you should have read the handout on the **Hermes II System** (discussed in session 10) and the paper on the findings from the Active Badge study [Spritzer,1993] and the paper describing Mark Weiser's vision of Ubiquitous Computing [Weiser, 1992].

This coursework assignment has been set to assess your understanding of a broad range of topics covered in the ITO.12 ICT module. As discussed in seminars/lectures the assignment uses the Hermes II office door display system as a case study (currently running on C floor in the InfoLab21 building).

For the assignment you should write a 'report' (i.e. written in sentences and paragraphs and providing full justification for your answers) and that is structured using the section headings described below. The report should have the title "Issues relating to the Design of the Hermes II Door Display System" and should have the section headings shown below (for this report you **do not** need to have a 'Conclusions' section). Note that underneath each section heading below is text describing what particular points you should address/answer in your report. The report should be no longer than 2000 words. Feel free to use figures in your report but please note that each figure will count for 150 words. Please use references as appropriate and see handout for details on this and presentation guidelines in general.

The submission deadline for the assignment is Monday 23rd April 2007 and will need to be submitted to the MSc ITMOC Secretary, Sian Cameron. This will involve submitting a CD containing a word or pdf version of the report along with 2 paper copies of your report.

1. Introduction to The Hermes II System

(This should be answered in section 1 of your report),

In this section you should briefly introduce the Hermes II system.

2. Content Presentation Issues

(This should be answered in section 2 of your report)

The Hermes II system maintains a set of web pages allowing a door display owner to view and change his or her currently visible message, view multimedia messages left by visitors to her door display etc.

Briefly describe **two** different web technologies that could be used to generate HTML pages dynamically for Hermes.

Briefly describe how dynamic content in the two technologies listed previously is produced. Your description should include any software components required at the web server and a description of how the dynamic content is authored.

[5 marks for this section]

3. Distributed Systems Issues

(This should be answered in section 3 of your report)

If the Hermes II system utilised a wireless communications network describe the key security issues which would arise from this approach.

To what extent are security problems reduced by the use of a high bandwidth wired network such as Gigabit Ethernet

The current Hermes II system is Java RMI based. Currently the system uses a SMS service called “*SMSService*” to support SMS messaging functionality (i.e. the functionality which allows an owner to receive a message such as “You have a new message left on your doorplate” on her mobile phone).

Consider, the following scenario. It is decided to support the Hermes II SMS messaging functionality using a third party service provider (assume the provider is called “ACME”). Given that the third party service provider is required to support the current Java RMI architecture, what steps would the provider need to take in order to provide the service.

When the Hermes II client invoked an operation on the *SMSService* service (which is implemented on the remote ACME server machine) a *Remote Procedure Call* interaction method is used. Briefly explain what you understand by this term and what advantages RPC offers the programmer over and above the use of a socket based invocation.

In the lectures an alternative distributed systems architecture to Java RMI was discussed which, for example, utilises a greater range of underlying communication protocols (e.g. HTTP, SOAP, SMTP etc.) – What is the common name given to this alternative architecture and why is this alternate architecture experiencing increasing popularity.

A key requirement for the Hermes II is high levels of reliability (i.e. the ideal goal is to have each door display and supporting systems running correctly 100% of the time). Given that the Hermes II system has a two-tier architecture, recommend one way to improve fault tolerance and briefly justify your choice.

[10 marks for this section]

4. Networking and Multimedia Issues

(This should be answered in section 4 of your report)

The Hermes II system will support video conferencing functionality (it has a camera that can capture at 640 by 480 pixels). Remembering to justify your answer and considering the protocols that we discussed in the multimedia lecture (mpeg1, mpeg2, H.261 and H.264), what would be a suitable video compression/decompression protocol to use to support the video conferencing functionality? Furthermore, given the use of fast wired Ethernet to connect door displays, which of the following two transport protocols: TCP or UDP, would be the most suitable transport to use?

[4 marks for this section]

5. Ubicomp Issues

(This should be answered in section 5 of your report)

The Hermes II system can be considered an example of a deployed ubiquitous computing system.

Discuss how this vision of ubiquitous computing fits in with Mark Weiser's vision

The Hermes system does not utilise any tracking technologies as such but rather enables a door display owner to post her current (or future) location on her door display, e.g. "Gone for lunch at the Pizza Place".

With consideration to the findings of Spreitzer paper on Active Badges – what was the reason for this?

[3 marks for this section]

6. Context-awareness

(This should be answered in section 6 of your report)

In the lectures we discussed the concept of Context-awareness (remember the GUIDE system?) How could Hermes II be usefully made more context-aware? Be careful to justify your suggestions and comment on possible disadvantages as well as advantages that your suggestions might pose.

[3 marks for this section]

*** [25 marks total] ***