

Birla Institute of Technology & Science, Pilani
Instruction Division
Department of Computer Science & Information Systems
First Semester: 2015-2016
Mid-Semester Examination (Regular)

Course No.: CS541 / SS G531 **Course Title:** PERVASIVE COMPUTING
Nature of Exam: Closed Book **Weightage:** 25% **Max. Marks:** 25
Duration: 90 Minutes. **Date of Exam.:** Oct. 7, 2015

Notes: Please make suitable assumptions, where necessary and briefly justify them. You cannot, however, change the nature of the question itself by making any assumptions.

1. Why and how is ubiquity of computing, sensing and communication networking elements considered to be responsible for the nomenclature 'Invisible Computing', at times? What is invisible here in the true sense?

1+1=2

2. Other than the complexity involved, do the following four other weaknesses have the ability to potentially affect real-life use of the Smart DEI Framework?

"While the Smart DEI Framework has any merits, it also suffers from a few issues that unless handled with great care and insight, lead into an overly complex design approach. In particular, apart from the potential complexity, the following principal demerits:

- Lack of proper structure
- Lack of any formal representation language or protocol
- Absence of any ready mechanism or even formalism to support import from or export to any standard specification or design language
- Almost no major example of real-world design that was realized by using this framework"

Please briefly justify your response.

1+1=2

3. Are there any mobility-specific differences (in the context of pervasive computing environments) that potentially distinguish Operating Systems for the following devices classes: Handheld Devices, Implanted Devices, Wearable Devices and Portable Devices? Would re-compiling standard Linux OS from source code for the target platform help in all such cases?

1x4+1=5

4. Consider the Google's Project Glass™ Research Projects discussed in the class in form of case-studies and suggest any specific changes you'd like to do differently, today than what was done by their designers, in terms of technology choices like those involving context-handling, HCI and privacy:

2*4=8

5. If you have to recommend a first-level, simple but unambiguous plan to transform existing Gallery type Classrooms (in BITS Pilani campuses at Pilani and Hyderabad) into entities that would allow intuitive, context-aware and collaboration-capable pervasive computing environments for all stakeholders providing the following features while keeping costs involved in check, as far as possible as well as keep in view the maintainability aspects of the proposed system:

- a. Speaker and audience identification
- b. Context-based pre-loading of the presentation material in the speaker's presentation computer (may be overridden by the user)
- c. Intelligent camera positioning as and when the speaker/presenter speaks near the Podium as well as when the speaker/presenter moves away from the podium by tracking of the presenter's movement
- d. Ambient lighting, air-flow and temperature handling within the respective rooms
- e. Voice-driven actuation of the audience-capturing camera and its resetting to the default wide-angle class-view when no one from audience is speaking

What changes / additions would you recommend to allow these functionalities and how, in terms of hardware, software, firmware, protocols and/or sensory and actuation elements and why?

1x5+3=8