Exam in Ubiquitous Computing 7.5 ECTS (5DV024)

Date: Thursday January 16th 2014
Writing time period: 9:00 - 13:00 hours
Location: Nolia
Number of questions: 16
Total number of points: 24

The teacher will be outside Sweden. Can be contacted through his mobile number +46705327134 or through skype (skype id: “dipak_surie”) between 10:00 a.m and 11:00 a.m.

Instructions
• Your answers to the exam questions should be written in English language.
• Write your name and personal number only on the first sheet where you also provide your signature. Subsequent answer sheets should not include your name or your other identities.
• In all the sheets, write you code. Leave Q Points and Total Points so far empty.
• Answers to the questions should be written in the space provided below the questions. If the space is not sufficient then use additional papers and attach them at the end of this booklet. Do not forget to include the question number in the additional booklet.
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• Do not write too much either even though you could have additional papers. 2-point questions should have a maximum length of 3 pages and 1-point questions should have a maximum length of 1.5 pages.
• If you think a question is unclear, decide for an interpretation and answer the question according to your interpretation. Describe all interpretations made. Some questions are vague with the sole purpose of making you think and discuss from the interpretations that you make.
• Write very clearly. Every unclear sentence will be interpreted to your disadvantage.
• Motivate your answers to all questions. If possible provide examples and diagrams to present your answers with better clarity.
• Be creative in answering some of the questions.

Good luck! Dipak

Code: Total Points: /24 Exam Grade:
Ubiquitous / Pervasive Computing

Q1. What are the three phases of computer usage? Describe them briefly based on:
   a. Human-to-computer ratio
   b. Interaction support offered

--------------- (1 point)
Ubiquitous / Pervasive Computing

Q2. What are the three generations of Ubicomp research? Discuss about them with suitable examples.

------------------ (2 points)
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<tr>
<th>Code:</th>
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<th>Total Points so far:</th>
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4
Context-Aware Computing

Q3. Explain the term “context” and “context-awareness” according to Anind Dey. Mention any two features of context-awareness useful in a smart kitchen with an appropriate example.

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(2 points)

Code: Q3 Points: Total Points so far:
Code: Q3 Points: Total Points so far:
Smart Objects and Environments

Q4. What are smart objects? How are they similar and different to everyday objects?

---------------------------------------- (1 point)
Tangible User Interfaces

Q5. What is the difference between “In-Band” and “Out-of-Band” Interaction? Describe the role of Tokens and Constraints in making it difficult or easy to distinguish between “In-Band” and “Out-of-Band” Interaction with an example and a figure.

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(2 points)
Code: Q5 Points: Total Points so far:
Activity Based Computing

Q6. Mention any 4 principles of Activity Based Computing according to Jacob Bardram?

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(1 point)
Activity Based Computing

Q7. How will you recognize the following activities (and their context)?
   a) Brushing teeth everyday in the morning
   b) Preparing pasta with a friend
   c) Swimming in a beach
   d) Hand washing the dishes at home

Describe your approach in terms of the sensor technology that will be used, and the computing techniques (what information will be fused, how?) for activity recognition.

------------ (3 points)
| Code: | Q7 Points: | Total Points so far: |
Proxemics Interaction

Q8. What is proxemics interaction? Mention its 5 dimensions, and use it to facilitate interaction in a smart restaurant.

-------- (2 points)
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<th>Code:</th>
<th>Q8 Points:</th>
<th>Total Points so far:</th>
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Ambient Media

Q9. What is informative art? Can the concept of peripheral and central attention be used in informative art? Discuss.

---------- (1 point)

Code: Q9 Points: Total Points so far:
Location Aware Systems

Q10. What are the three approaches to automatic sensing of location? How can wireless cellular access point(s) be used in those approaches?

---------- (2 point)
| Code: | Q10 Points: | Total Points so far: |
Wearable Computing

Q11. How will you measure networking and heat dissipation of wearable computers? (Can be answered in a single sentence) 

---------- (1 point)
Wearable Computing

Q12. Describe in your own words Licklider’s vision of Man-Computer Symbiosis.

--------- (1 point)
Augmented/Mixed Reality

Q13. Describe Milgram’s Reality-Virtuality Continuum with a figure. 

---------- (1 point)
Ubiquitous Computing Applications

Q14. How was proactive computing useful in the vineyard application presented during the lecture?

-------- (1 point)
Evaluation Techniques

Q15. Mention and compare briefly the three evaluation techniques for ubiquitous computing.

-------- (1 point)
Evaluation Techniques

Q16. Discuss the following evaluation areas with reference to the design of a smart airport.
   a. Conceptual models
   b. Impact and side effects
   c. Trust
   d. Attention

---------- (2 points)
Exam in Ubiquitous Computing 7.5 ECTS (5DV024)

Date: Saturday April 26th 2014
Writing time period: 9:00 - 13:00 hours
Location: ÖP6
Number of questions: 16
Total number of points: 24

The teacher can be contacted through his mobile number 0705417846 or 0705327134 between 10:00 a.m and 11:00 a.m.

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Code: Total Points: /24 Exam Grade:
Ubiquitous / Pervasive Computing

Q1. What are the three phases of computer usage? Describe them briefly based on:
   a. Human-to-computer ratio
   b. Interaction support offered

---------------- (1 point)
Ubiquitous / Pervasive Computing

Q2. What are Smart Spaces? How does Localized Scalability and Uneven Conditioning affect the design of Smart Spaces? Discuss with an example.

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4
Context-Aware Computing

Q3. Explain the term “context” and “context-awareness” according to Anind Dey. Why is it important to make ubiquitous computing systems context-aware? Discuss it in comparison to desktop computing.

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Smart Objects and Environments

Q4. What are smart objects? How are they similar and different to everyday objects?

--------------------------------------- (1 point)
Tangible User Interfaces

Q5. What are the three approaches to tangible user interfaces? Discuss and compare them with suitable examples and diagrams.

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(2 points)
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9
Activity Based Computing

Q6. What is sensor fusion?
   Why is it important in recognizing human activities?
   Discuss it with an example.

------------------ (1 point)
Activity Based Computing

Q7. How will you recognize the following activities (and their context)?
   a) Dancing in a disco
   b) Showing a demo of your Ubicomp project
   c) Gardening
   d) Preparing pasta sauce

Describe your approach in terms of the sensor technology that will be used, and the computing techniques (what information will be fused, how?) for activity recognition.

----------- (3 points)
Proxemics Interaction

Q8. What is proxemics interaction? Mention its 5 dimensions, and use it to facilitate interaction in a smart museum.

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14
Ambient Media

Q9. What is informative art? Design an artifact that makes use of the concept of informative art.

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(1 point)

Code: Q9 Points: Total Points so far:
Location Aware Systems

Q10. Describe the following.
   a) Absolute location
   b) Relative location
   c) Physical location
   d) Symbolic location.

For the location information -> "On the train to Stockholm", how will you determine its absolute location, relative location, physical location and symbolic location? Think and argue logically with your personal interpretations.

---------- (2 point)
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17
Wearable Computing

Q11. How will you measure networking and heat dissipation of wearable computers? (Can be answered in a single sentence)

---------- (1 point)
Wearable Computing

Q12. What are the common parts of a wearable computer? Sketch a figure to locate the common parts.

---------- (1 point)
Augmented/Mixed Reality

Q13. Describe Milgram’s Reality-Virtuality Continuum with a figure. 

----------- (1 point)
Ubiquitous Computing Applications

Q14. What is proactive computing? Can proactive computing be used in a car accident scenario? Discuss briefly with one logical argument for your opinion.

-------- (1 point)
Evaluation Techniques

Q15. Discuss about the following ubicomp evaluation areas.
   a) Adoption
   b) Attention

---------- (1 point)
Evaluation Techniques

Q16. Compare in-situ evaluations with immersive virtual reality evaluations when designing a smart car park. How will you use both the evaluation techniques to your advantage?

---------- (2 points)
Exam in Ubiquitous Computing 7.5 ECTS (5DV024)

Date: Thursday June 12th 2014
Writing time period: 9:00 - 13:00 hours
Location: ÖP7
Number of questions: 16
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Good luck! Dipak

Code: Total Points: /24 Exam Grade:
Ubiquitous / Pervasive Computing

Q1. What is the Internet of Things? Compare it to the present day Internet.  

---------- (1 point)
Ubiquitous / Pervasive Computing

Q2. What are the three generations of Ubicomp Research? Discuss with an example for each of the three generations.

------------- (2 points)
Context-Aware Computing

Q3. Explain the term “context” and “context-awareness” according to Anind Dey. Why is it important to make ubiquitous computing systems context-aware? Discuss it in comparison to desktop computing.

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Smart Objects and Environments

Q4. Why is designing automated homes a huge challenge? Discuss using a scenario.

---------------------------------- (1 point)
Tangible User Interfaces

Q5. What are the three approaches to tangible user interfaces? Discuss and compare them with suitable examples and diagrams.

----------------

(2 points)
Code:         Q5 Points:         Total Points so far:
Activity Based Computing

Q6. What is sensor fusion?
   Why is it important in recognizing human activities?
   Discuss it with an example.

------------------ (1 point)
Activity Based Computing

Q7. How will you recognize the following activities (and their context)?
   a) Writing an examination
   b) Running in a marathon
   c) Gardening
   d) Baking a cake with a friend

Describe your approach in terms of the sensor technology that will be used, and the computing techniques (what information will be fused, how?) for activity recognition.

------------- (3 points)
| Code: | Q7 Points: | Total Points so far: |
Egocentric Interaction

Q8. Use the concept of perception space and action space to design a cooking assistant for a kitchen populated with smart everyday objects.

---------- (2 points)
Ambient Media

Q9. What is informative art? Design an artifact that makes use of the concept of informative art.

--------- (1 point)
Location Aware Systems

Q10. Describe the following.
   a) Absolute location
   b) Relative location
   c) Physical location
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For the location information -> "On the train to Stockholm", how will you determine its absolute location, relative location, physical location and symbolic location? Think and argue logically with your personal interpretations.

--------- (2 point)
Wearable Computing

Q11. How will you measure networking and heat dissipation of wearable computers? (Can be answered in a single sentence) 

---------- (1 point)
Wearable Computing

Q12. How does Thad Starner define a wearable computer? Describe it in your own words.

-------- (1 point)
Augmented/Mixed Reality

Q13. Describe Milgram’s Reality-Virtuality Continuum with a figure.

---------- (1 point)
Ubiquitous Computing Applications

Q14. What is proactive computing? Can proactive computing be used in a car accident scenario? Discuss briefly with one logical argument for your opinion.

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Evaluation Techniques

Q15. Discuss about the following ubicomp evaluation areas.
   a) Conceptual Models
   b) Invisibility

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Evaluating Techniques

Q16. Compare in-situ evaluations with immersive virtual reality evaluations when designing a smart car park. How will you use both the evaluation techniques to your advantage?

---------- (2 points)
Code: Q16 Points: Total Points so far:

----------The End ----------

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