Exam on DA274A Internet of Things and People
2017-06-10, 14:15-18:15

Tools

Pen and paper

Instructions

Address at most one assignment per paper sheet, write only on one of the sides, and mark each sheet with your initials. Try too keep your answers as short as you can (usually one sentence is enough). Max number of points on this exam is 43 points. For the grade "Väl Godkänd" you need to acquire at least 32 points (75%) and for the grade "Godkänd" you need to arrive to at least 22 points (50%).

Good luck! /Thomas, Shahram, Ulrik, Radu, Andreas

Question 1 (2 points)

Mark Weiser worked at an industrial research lab when he wrote the influential research article "The Computer for the 21st Century" in Scientific American and when he first started to use the term "Ubiquitous Computing".

a) What was the name of that research lab? (1p)

b) Approximately in what year was the article published? (1p)

Question 2 (4 points)

As part of the design process, developers of interactive systems (including Ubicomp systems) tend to iteratively go into different phases where the focus of the activities have specific target outcomes. Benyon (2010) pictures these four kinds of design activities as shown in the figure below:
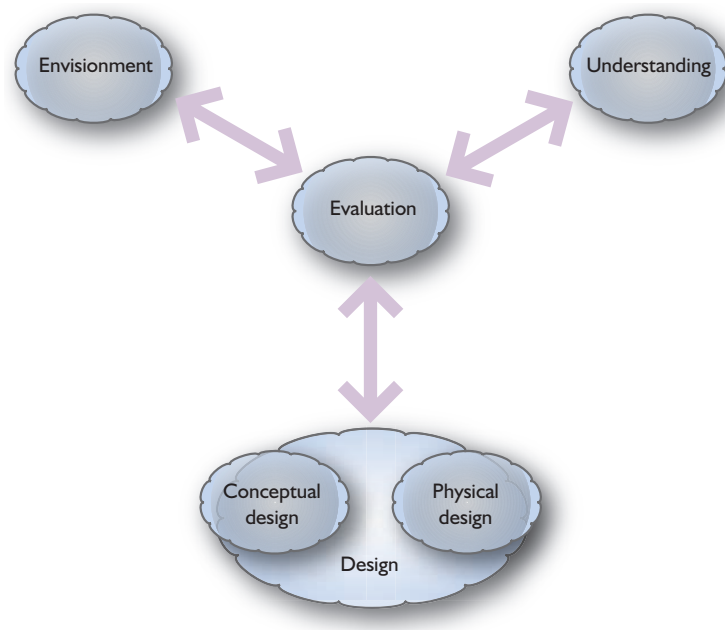
(Benyon, 2010)

For each of the four types of activities, explain with 1-3 sentences the focus of the activity and what the activity aims at determining. (1 + 1 + 1 + 1p)

Question 3 (1 point)

Explain in one sentence why it is better to fail early in a design process rather than late? (1p)

Question 4 (1 point)

From the perspective of system architecture design, mobile and pervasive computer systems are very different to more classical stationary computer systems: "changes are common rather than exceptional". What is the English term used to describe this property of dynamism shared by all mobile and pervasive systems? (1p)

Question 5 (1 points)

Explain, using 1-2 sentences, what a "smart space" is in the context of Ubiquitous Computing. (1p)

Question 6 (4 points)

In the context of designing for interoperation between system components, e.g. a camera and a digital frame, there is the "object-oriented" approach and the "data-oriented" approach. What is the advantage and disadvantage of each of these two approaches to interoperation? (4p)

Question 7 (2 points)

Explain with 1-3 sentences what (the difference between) implicit and explicit *output* is in the context of human-computer interaction? (2p)

Question 8 (3 points)

In context-aware systems, knowledge about *who* is doing *what*, and *where* is often something the systems try to figure out in order to reduce the need for human agents to provide explicit input. For each of these three context parameters, using 1-2 sentences, give an example of a common technology and/or method for determining the specific context parameter. (3p)

Question 9 (1 points)

The design of context-aware systems involves overcoming both technical and interaction design challenges. One of the latter is the general wish that the system has a high level of "intelligibility". What does it mean that a system is intelligible? (1p)

Question 10 (3 points)

When discussing location tracking and location-based systems, we sometimes talk about different ways in representing location, or *location types*. Provide a data example of a) absolute location, b) relative location, c) symbolic location! (3p)

Question 11 (5 points)

Pair the following location tracking *technologies* with the most suitable location tracking *approach (5p)*:

Technologies	Approaches
WiFi routers / clients	proximity
QR codes / cameras	dead reckoning
GPS satellites / receivers	hyperbolic lateration (time difference of arrival)
accelerometers	angulation
RFID tags/readers	fingerprinting

Question 12 (2 points)

The performance of location tracking systems is sometimes measured in terms of *precision* and *accuracy*. What do these two metrics actually measure? (2p)

Question 13 (4 points)

The three most common kind of tags used in Ubicomp/IoT systems are visual tags, radio-based tags, and infrared tags. a) give an example of radio-based tag standard and common application area for that tag standard. b) give an example of a visual tag standard and common application area for that tag standard. (2 + 2p)

Question 14 (2 points)

What is the difference between supervised and unsupervised learning? (2p)

Question 15 (2 points)

Explain two different methods for evaluating the accuracy of a classifier or predictor? What are the proc and cons of each one? (2p)

Question 16 (3 points)

Name at least three typical IoT privacy challenges. (3p)

Question 17 (3 points)

What are the advantages and disadvantages of using Cloud-based vs.

Decentralised approach for implementing IoT applications. Illustrate your

points with examples. (3p)