Vrije Universiteit, Faculteit Exacte Wetenschappen,
Afdeling Informatica

Tentamen **Pervasive Computing**
26 maart 2012 8:45-11:30
MF-FG1

Dit is een gesloten boek tentamen.

Tijdens het tentamen mogen geen schriftelijke of elektronische artikelen worden geraadpleegd.

De antwoorden kunnen in het Nederlands of Engels gegeven worden.

Er zijn 6 tentamenvragen, Q1..Q6 en de som ervan is maximaal 90p.

Het tentamencijfer wordt berekend als:
(Q1+Q2+...Q6+10)/100

Het eindcijfer wordt berekend als 0.4*practicum + 0.6*tentamen.

Beide onderdelen moeten >= 5.5 zijn voor een voldoende.

	Q1	Q2	Q3	Q4	Q5	Q6	ΣQi	Maximum = (ΣQi+10)/10
a)	6	7	7	5	7	7		
b)	6	5	7	5	5			
c)	6			5				
d)	6							
e)	6							
Totaal	30	12	14	15	12	7	90	10

SUCCES!

Q1. Short questions [30p]

a) What meant Marc Weiser with smart tabs and smart pads ? Give for each category examples of devices that already exist. [6p]
b) What means sampling frequency? Give an example. [6p]
c) What is a body area network? Give an example. [6p]
d) What is a multimodal travel assistant? Give an example. [6p]
e) What means deliberative control? Indicate a kind of application for which this type of control is suitable [6p]

Q2. Navigation [12p]

a)The last known position of a robot in a 2D Cartesian plane was X=100 cm and Y=55 cm. The robot moves with constant speed of 1cm/sec with a heading of $\theta=60^{\circ}$. Apply deadreckoning to calculate the robot's coordinates after 5 min. Given is that: $\cos(60^{\circ}) = 0.5$, and $\sin(60^{\circ})=0.866$.[7p]

b)What is the difference between the Dijsktra and A* shortest path searching algorithm? [5p]

Q3. Intelligent Vehicles [14p]

a) Many cars are fitted with cruise control that, at the press of a button, automatically maintains a set speed. In this way, the driver can cruise at a speed limit or economic speed without continually checking the speedometer. Design a feedback control block diagram for a cruise control system. [7p]
b) Write a pseudocode reactive controller for a robot to avoid objects using ranging sensing [7p]

Q4. Assisted living [15p]

Design a system for fall detection in an elderly home. Describe
a) What kind of sensors and actuators are you going to use [5p]
b) what kind of algorithms, [5p]
c) advantages and disadvantages for your solution. [5p]

Q5. Communication [12p]

a) Draw a diagram where you show the components of a wireless sensor node. [7p]
b) Why is the last mile coverage in the case of WiMax networks lower when the device is mobile (15km) than when it is fixed (50 km)? [5p]

Q6. Social aspects. [7p]

Formulate an ethical dilemma for the system you designed for your final assignment. Describe at least one factual and one conceptual question that have to be answered in order to solve this ethical dilemma.