Mobile and Context Aware Interactive Systems

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Warning: This exam has TWO PARTS. These parts will be graded separately by James L. Crowley (part I) and Gaëlle Calvary (Part II). Provide your answers to each part on SEPARATE pages. Make sure your NAME, page number and the exam part (I or II) are marked on EVERY page.

You may use any printed material or course notes. All answers must be written in ink on official exam paper. You may answer the questions in English or in French. You must write LEGIBLY. Illegible text will not be graded.

Part 1. (6 points, estimated time 45 minutes) You have been hired to design a Context Aware Services Advisor (CASA) for automobiles. Your system runs inside a private automobile and uses a flat panel display to provide non-disruptive suggestions for possible commercial services. Service suggestions are based on context information, including location, current navigation planning, time of day, and the car state. The system receives information from (1) a GPS, (2), a route map, (3) a GPS based navigation planner (4) the internet (5) current vehicle conditions including speed, available fuel, oil level, battery charge, and brake conditions, (6) a model of driver preferences.

Use this following scenario to answer the questions: John is driving to Nice on the A6. The current time is 11h30 and he currently passing Valence. The car has less than 1 hour of Gasoline left, while route will require 4 more hours of driving. The user model indicates that John likes Italian food and that John likes to eat at noon. The Context Aware Services Advisor indicates that in 45 minutes and 3 highway exits, John will be pass the town of Montélimar where he can leave the highway and find an AGIP Gas station next to Giulio's Pizzaria. It also indicates that the next exit is in 15 minutes and contains an ESSO Gas station steak and fries restaurant.

Hint: KEEP IT SIMPLE. Define and illustrate the concepts. Do not worry about being "all-inclusive".

a) Define the concept of entity, and list the entities that must be observed by the system in the scenario.

b) Define the concept of the role and list the roles that are used in the scenario.

c) Define the concept of relation and list the relations between entities playing roles for this scenario.

d) Define the concept of systems action. List the set of system actions needed for the scenario described above.

e) Define a network of situations for the scenario described above. For each situation, list the relations, and list the system actions.

f) Define the concept of perceptual component. Define the perceptual components used by the CASA system, by listing their input channels, output channels and events, and functions.