Name: **Id#**

COE 306, Term 171

Introduction to Embedded Systems

Quiz# 1 Solution

Date: Tuesday, Oct. 3, 2017

Q1. What is an embedded system? Give two examples of embedded systems.

An Embedded system is any device that includes a programmable computer but is not itself a general-purpose computer. Examples: calculator, fax, clock, coffee maker, printer, TV, microwave, camera, car.

Q2. One of the main characteristics of embedded systems is that they must finish operations by meeting real time deadlines. Explain the types of real time deadlines and give an example of each.

- Hard real time: missing deadline causes failure; e.g., missed deadlines in printers can result in scrambled pages
- Soft real time: missing deadline results in degraded performance; e.g., Streaming audio-video

Q3. List the steps involved in the design process of an embedded system.

1. Requirements
2. Specification
3. Architecture
4. Component design
5. System integration

Q4. Describe what the specification of an embedded system should provide and what it should not.

Specification of an embedded system should provide input to the architecture design process, and should clarify design objectives and prevents faulty assumptions. However, it should not imply a particular architecture

Q5. Give two examples of non-functional requirements.

- Performance: time required to compute output;
- Cost: includes manufacturing and nonrecurring engineering (NRE) costs
- Physical size and weight
- power consumption, reliability; etc.

Q6. Describe what is defined in a class in UML.

A class defines attributes that an object may have and operations that determine how the object interacts with the rest of the world.

Q7. In UML, a state machine is event driven. Describe two types of events that may occur which make the system move from one state to another.

- A signal is an asynchronous occurrence. It is defined in UML by an object that is labeled as a «signal».
- A call event follows the model of a procedure call in a programming language.
- A time-out event causes machine to leave state after certain amount of time.