Week 1 Embedded system design

1. An embedded system is always programmable.
    a. True
    b. False
Ans – b. False
Explanation – Apart from Embedded systems being programmable an Embedded system can also be hardwired.

2. There can be multiple embedded systems present in a larger system.
    a. True
    b. False
Ans – a. True
Explanation –Take for example an car (larger system) can have multiple embedded systems present in it for example - Antilock Braking System(ABS), Engine Control Unit (ECU), Traction Control System etc.

3. An Embedded System differs from General Purpose system in which of the following factor(s)
    I. Lower Power Consumption
    II. Lower Cost
    III. Portable
    IV. Multipurpose
 	
    a) I
    b) I,III
    c) III,IV
    d) I,II,III
    e) I,II,III,IV
 	
Ans –d)I,II,III
Explanation- An Embedded system is used for single purpose whereas a General Purpose System is used for General purpose. Embedded system is tightly constrained in terms of low cost, low power consumption, portable and sometimes it must be realtime.

4. Boiler of a Thermal Power Plant is equipped with embedded systems which control and maintain the temperature and pressure inside the boiler. The Embedded systems must be
    a. Soft realtime systems
    b. Hard realtime systems
Ans – b. Hard realtime systems
Explanation – Overshooting deadline to complete a task of controlling temperature and pressure can lead to major catastrophe, that's why stringent time constraints are present and embedded systems in the above case must be Hard Realtime embedded system

5. The design activity where operations are mapped to hardware or software is
    a. Compilation
    b. Scheduling
    c. Processor Design
    d. Hardware-Software Co-Design
    e. None of the above
Ans – d. Hardware-Software Co-Design
Explanation – The hardware/software Co-Design is the activity which is in charge of mapping operations to the software or to the hardware

6.

If a component is implemented in software then
   a. It will be faster
   b. It will be Slower
   c. It will be Costly
   d. None of the above

Ans – b. It will be Slower

Explanation – Designing any component in software leads to the system to be slower as the system has to process it separately by allocating separate CPU time but on the other hand it leads to the system to be more flexible as it would able to perform more functions on the programmer's side.

7.
   If a component is implemented in hardware then
   a. It will be flexible
   b. It will be faster
   c. It will be cheaper
   d. None of the above

Ans – b. It will be faster

Explanation – Designing a specific component in hardware helps in making that component fast but leads to more time consumed in designing the hardware parts and hence the increase in cost related to it, and makes the system less flexible too on programmer's side.
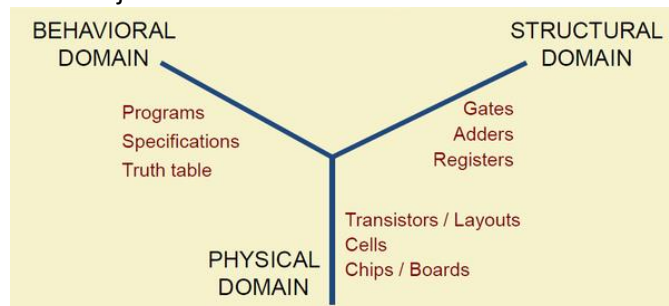
8.
   Placement and Routing task comes under which design step
   a. Structural Design
   b. Geometrical Design
   c. Behavioral Design
   d. None of the above

Ans – b. Geometrical Design

Hint – Gajski's Ychart

BEHAVIORAL DOMAIN   STRUCTURAL DOMAIN

Programs   Gates
Specifications   Adders
Truth table   Registers

                        Transistors / Layouts
                        Cells
PHYSICAL   Chips / Boards
DOMAIN

Explanation – Placement and Routing task is a part of Geometrical design step as we need to place and route the structure of circuit obtained in structural design step.

9.
   There is no distinction in between data memory and program memory in Harvard Architecture
   a. True
   b. False

Ans – b. False

Explanation - There is no distinction in between data memory and program memory in Von-Neumann Architecture but in Harvard architecture they are separate.

10.

A Timer is set to zero and at every clock pulse it counts up and at any point of time we can find out the time elapsed.

a. True
b. False

Ans – b. False

Explanation - A Counter is set to zero and at every clock pulse it counts up and at any point of time we can find out the time elapsed.