

## IT 2354 -EMBEDDED SYSTEMS

### UNIT-1 EMBEDDED COMPUTING

1. What is embedded system?

An embedded system performs a single well defined task. It is a combination of hardware and software.

2. What are the requirements of embedded system?

1. Reliability
2. Low power consumption
3. Cost effectiveness
4. Efficient use of processing power

3. Give the characteristics of embedded system?

- a) Single functioned
- b) Tightly constrained
- c) Reactive and real time

4. What are the challenges of embedded system?

1. Hardware needed
2. Meeting the deadlines
3. Minimizing the power consumption
4. Design for upgradeability

5. Give the steps in embedded system design?

- A. Requirements
- B. Specifications
- C. Architecture
- D. Components
- E. System integration

6. What are the requirements?

Before designing a system, it must to understand what has to be designed. This can be known from the starting steps of a design process.

7. Give the types of requirements?

1. Functional requirements
2. Nonfunctional requirements

8. What is the use of requirements form?

It is used as a checklist in the requirements analysis. From this the fundamental properties of a system came to be known.

9. What are the entries of a requirement form?

- a) Name
- b) Purpose
- c) Inputs and outputs
- d) Functions
- e) Performance
- f) Manufacturing cost
- g) Power
- h) Physical size and weight

10. Give the types of cost?

- a) Manufacturing cost
- b) NRE cost

11. What is meant by specification?

This is a bridge between customer and architect. It conveys the customer's needs. These needs are properly used in the design process.

12. What is architectural design?

It says the way of implementing functions by a system. Actually architecture is a plan for whole structure of a system. While will bring the design of components later.

13. What is microcontroller?

A microcontroller is a device possessing some or all of the specialized instructions and peripheral devices, communication devices etc.

14. Define RAM?

RAM refers Random Access Memory. It is a memory location that can be accessed without touching the other locations.

15. What is data memory?

When the program is executing, to save the variable and program stack, this type of memory is used.

UNIT-2  
MEMORY AND INPUT/OUTPUT MANAGEMENT

1. Define data and status registers?

Data register holds the value that is treated as data by the device like data read or written by a disk.

Status register provides information about the device's operation like whether the current transaction has completed.

2. Define memory mapped I/O?

This is the general strategy in order to implement I/O. Also the CPU which gives I/O instructions can implement the memory mapped I/O. Memory mapped I/O gives address for the registers in every I/O devices.

3. Write about interrupt?

Interrupt provides the devices to signal the CPU and to force execution of a particular piece of code.

4. What are the types of I/O devices?

1. Synchronous serial input
2. Synchronous serial output

5. Define baud rate?

At the uniform rate, normally the dated bits are transmitted as high and low voltages. This rate is said to be baud rate. CPU has to set the mode registers before transmitting or receiving the data.

6. What the parameters of serial port?

- a) Baud rate
- b) Bits count per character
- c) Stop bit length
- d) Whether parity is to be added or not
- e) Whether it is even or odd parity

7. Define RAM and its types?

Random Access Memories are referred as RAM. These can be both read and written. Types are

1. Static RAM
2. Dynamic RAM

8. Expand SIMMS and DIMMS?

SIMMS refers single in line memory modules and DIMMS refers double in line memory models.

9. Define cache?

Cache memory often resides on chip and often uses fast but expensive static RAM technology. It is tiny and fast memory which keeps the copies of some of the contents of main memory.

10. Define cache hit?

When the requested location found in the cache

- Cache controller moves the contents of that requested location to the CPU.
- Also it aborts the main memory request.

This situation is called as cache hit.

11. What is cache miss?

When the location is not in the cache

- Cache controller has to wait for the value which may be taken from memory.
- Then it can be sent to the CPU.

This condition is referred as cache miss.

12. What are the types of cache miss?

- Compulsory miss or cold miss
- Capacity miss
- Conflict miss

13. What are fields of cache block?

Every cache block contains 3 fields.

1. Tag field
2. Data field
3. Valid field

14. Explain memory interfacing?

It must both construct the memory when there is a requirement of more memory in a single chip. When a memory is constructed, it is wide in size also.

15. Define Device Interfacing?

Some of the I/O devices are directly interfaced with the bus. This gives glue less interface. If some other devices is not designed in such a way means then there is a need of glue logic.

UNIT-3  
PROCESS AND OPERATING SYSTEM

1. Define process?

This says the state of an executing program.

2. What is termed as tasks?

Task is defined as a set of computations or actions that processes on a cpu under the control of a scheduling kernel.

3. What is multirate system?

When multiple rates of computations have followed, it is difficult to write the code for fulfilling the timing needs. eg:- printers, cell phones

4. What are the states of a process?

- a. Running
- b. Ready
- c. Waiting

5. Define hyper period?

It refers the duration of time considered and also it is the least common multiple of all the processes.

6. What is schedulability?

It indicates any execution schedule is there for a collection o process in the system's functionality.

7. What are the types of scheduling?

1. Time Division multiple access scheduling
2. Round robin scheduling

8. What is cyclostatic scheduling?

In this type of scheduling interval is the length of hyperperiod 'H'. For this interval a cyclostatic schedule is separated into equal sized timeslots.

9. Define round robin scheduling?

This type of scheduling also employs the hyperperiod as an interval. The processes are run in the given order.

10. What is meant by context switching?

The actual process of changing from one task to another is called a context switch.

11. Define priority scheduling?

A simple scheduler maintains a priority queue of processes that are in runnable state.

12. What is rate monotonic scheduling?

Rate monotonic scheduling is an approach that is used to assign task priority for a preemptive system.

13. Define earliest deadline first scheduling?

This type of scheduling is another task priority policy that uses the nearest deadline as the criterion for assigning the task priority.

14. What is ICD mechanism?

It is necessary for a 'process to get communicate with other process' in order to attain a specific application in an operating system.

15. What are the two types of communication?

1. Shared memory
2. Message passing

## UNIT -4 EMBEDDED SOFTWARE

1. Define assembly language?

Assembly language is a language which converts the assembly language program into machine language program.

2. Give the characteristics of multi state systems?

- Here a series of system states are employed.
- One or more functions are involved in every state.
- Transition between states can be demonstrated by using some rules.

3. Give the types of system programming languages?

- Strongly typed-example C and C++
- Loosely typed-example FORTRAN and BASIC

4. What is High level language?

It is a type of language like English which can be easily understand by the users.

Eg:- C.C++

So it is called as user friendly language and used widely in many of the applications.

5. Give C Programming Elements?

1. Header
2. Source files
3. Preprocessor directives

6. Define preprocessor directives?

The preprocessor directives are used in the 'C' programs along with the preprocessor constants, variables & inclusion of configuration files & text files.

7. Name the types of preprocessor directives?

1. Preprocessor global variables
2. Preprocessor constants

8. What is Preprocessor global variable?

The global variables are listed out such as Intrenable, Intrdisable, IntrportAEnable & IntrportADisable in the 'C' programs.

9. What is preprocessor constants?

This Preprocessor is used to hold the constant value in the program. The 'define' directive is for giving the pointer value in the program.

EX:

```
#define True 1
```

10. Write the syntax of function class?

```
Returntype functionname (parameter_list)
```

Where

Return type -> is the return type of given functions

Functionname -> is name of the function

Parameter -list -> is the list of arguments if presence

11. Define Function call?

The function call be called by it's name followed by a set of parenthesis or with return type of that function and also the argument is present in the function.

EX:

```
int add ( int a, int b)
```

int- return type of function 'add'

add- function name

a.b- arguments & their data types are also represented as integer in the function call

12. Give the uses of timer?

It is used to produce the delay. It is employed in

1. Creation of an operating system
2. Real time applications

13. What is the need for 'timeout' mechanisms?

When a system has to be created as reliable then it should assure that no function will hang. To do this assurance, there are 3 many ways. They are

1. loop timeout
2. hardware timeout

14. Give the types of multi state systems?

1. Multi-state (timed)
2. Multi-state (input/timed)
3. Multi-state (output)

15. Define the implementation of a Multi state (timed) systems?
1. System will be operated in 2 or more states.
  2. More than one function calls are invoked in every state.

## UNIT-5 EMBEDDED SYSTEM DEVELOPMENT

1. What is design technology?  
Design technology involves the manner in which we convert our concept of desired system functionality into an implementation.
2. Define design methodology?  
Design methodologies are used in taking the decisions at the time of designing the large systems.
3. What is meant by design process?  
A product which will be beneficial is developed by the design process.
4. Give the objectives of design process?
  1. Time to market
  2. Design cost
  3. Quality
5. Define requirement analysis?  
It tells fundamental characteristics of a system.
6. What is the purpose of testing?  
Testing is used to find the errors.
7. What is spiral model?  
This is an alternative model for the software development. It says the many versions of a system which will be built.
8. What are the advantages of spiral model?  
It is more realistic than waterfall model. Because many iterations are to include enough detail to fulfill a design.
9. What is the use of successive refinement development model?  
This is used to understand the system on which the designer working by a series of design cycles.

10. What are the elements of concurrent engineering?

1. Cross functional teams
2. Concurrent product realization process activities
3. Incremental information sharing
4. Integrated project management
5. Early and continual supplier involvement
6. Early and continual customer focus

11. Define specification?

It represents the more detailed, precise and constant consistent descriptions of the system which can be used to create the architecture.

12. What are functional requirements?

This refers other available attributes collection.

- Maintenance
- Testing
- Coding
- Architecture
- Requirements

13. What is control oriented specification languages?

To specify the control in UML, state machines are generally used.

Ex:- SDL It is a language used to specify the control in UML.

14. Give one example for graphical specification?

- Caller gets dial tone
- Caller goes
- Off-hook
- Telephone on-book
- Dial tone

15. Give the steps in CRC process?

1. Identify classes responsibilities
2. Assign responsibilities
3. Identify collaborators

