October 29, 2020

# Write a short program in C.

Write a short C program that checks whether a number is a power of 2. Try to write a program that will perform the test most efficiently.

If you make any assumptions please specify them. Make sure that the syntax is correct.

# IP Networks.

The following network is given:



Station A (10.10.10.10) wants to send an IP packet to Station B (20.20.20.20.20). Station A knowns only as the IP address of station B.

Describe the steps and types of messages that will go through the network for the package to go from A to B.

# Operating Systems.

1. Given are 3 tasks/threads running, each one of them has different priority level.

The lowest priority task performs an infinite loop:

**while(1) {**

**counter++;**

**}**

One of the higher priority tasks should run. Explain what will cause the task to run and how the transition will be made.

1. Given are two Threads. One thread writes to memory an array of 10 entries and the other thread reads the same array from memory. Can it generate a problem? If yes, how can you solve it?

# Protocols.

1. Explain in detail how TCP’s protocol reliability is implemented.
2. What protocol: TCP or UDP would you use for VoIP transfer? Explain why.

# Data Structure.

Write a function that implements removal of element from a one-way linked list. You should consider end cases (blank list).

# General.

1. Variables:
   1. What is the difference between a global and local variable?
   2. Where are they located in the memory?
   3. In what case should you use each one of them?
   4. What is the life span of each one of them?
2. Compare between recursive solution a serial solution – in terms of performance and memory.
3. What's the difference between a macro and an INLINE function??
4. What is the benefit of using alignment?
5. How parameters are passed in function calls?
6. What's the difference between Thread and Process?
7. What is the size of a pointer variable?

# Linux Shell scripting

1. What will be the output of the following command:
   1. printf "%d %d\n" 1 2 3 4 5
2. Write a script that reads a text file, line by line, and prints the line.
3. Change the script that prints the file from end to start.
4. How do I continuously track a log file update?
5. What command will we use to check whether $a is greater than 12