Operating Systems Sample Questions

Operating Systems Overview

(1) What is an Operating System? List its primary responsibilities.

(2) What are the three (or four) different ways in which OS code can be invoked? Explain.

(3) Explain the following interfaces in a computer system
   (a) Instruction Set Architecture (ISA)
   (b) User Instruction Set Architecture (User ISA),
   (c) System ISA,
   (d) Application Binary Interface (ABI).
   (e) Application Programmers' Interface (API)

(4) Why doesn't a program (executable binary) that is compiled on the linux machine execute on a Windows machine, even if the underlying CPU hardware is the same (say x86)?

(5) What is meant by virtualization? Give examples of many(virtual)-to-one(physical, one-to-many, and many-to-many resource virtualization.

(6) What was the first computer? First OS? First language? Who was the first programmer?

Basics

(7) Solve the following:
   A. How much is 2^{13} in decimals?
   B. How much is roughly 1 billion in powers of 2? 1 million? 1 thousand?
   C. How much is $2^{64}/2^{21}$ in power of 2?
   D. How much is 128MB/4KB ?
   E. How much is $\log_2(8192)$?
   F. 2^{30}bytes of storage equals?
   G. 1 Gbps network bandwidth equals how many bits per second (bps)?

(8) When measuring I/O throughput, what is the difference between the units
   A. MBps and Mbps?
   B. KBps and Kbps?

(9) How is a Mebibyte different from Megabyte?

(10) How much are these units in decimals?

A. Pico
B. Nano
C. Micro
D. Milli
E. Kilo
F. Mega
G. Giga
H. Tera
I. Peta

Hint: For metric system: See http://www.chemteam.info/Metric/Metric-Prefixes.html
For size of information in computers see: https://web.stanford.edu/class/cs101/bits-gigabytes.html

(11) Replace "?" below with the correct answer

A. 1 Nanosecond = ? seconds
B. 500 Milliseconds = ? seconds
C. 4 KB = ? bytes
D. 4 Kilometers = ? meters
E. 4 Kbps = ? bits per second