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CMPS111-hw1

Question1:

1. The first generation (1945-1955): Vacuum Tubes

   In these early days, a single group of people (usually engineers) designed, built, programmed, operated, and maintained each machine. All programming was done in absolute machine language, or even worse, by writing up electrical circuits by connecting thousands of cables to plugboards to control the machine's basic functions. Operating systems were unheard of.
2. The second generation (1955-1965): Transistors and Batch Systems:

   The introduction of the transistor in the mid-1950s changed the picture radically. Computers became reliable enough that they could be manufactured and sold. For the first time, there was a clear separation between designers, builders, operators, programmers and maintenance personnel. Large second-generation computers were used mostly for scientific and engineering calculations. They were largely programmed in FORTRAN and assembly language. Typical operating system were FMS and IBSYS, IBM's operating system for the 7094.
3. The third generation (1965-1980): ICs and Multiprogramming:

   Although third-generation operating systems were well suited for big scientific calculations and massive commercial data-processing runs, they were still basically batch systems. The desire for quick response time paved the way for TIMESHARING, a variant of multiprogramming, in which each user has an online terminal. Another major development during the third generation was the phenomenal growth of minicomputers, starting with the DEC PDP-1 IN 1961. One of the computer scientists who had worked on the MULTICS project, found a small PDP-7 minicomputer that no one was using and set out to write a stripped-down, one-user version of MULTICS. This work later developed into UNIX operating system, which became popular in the academic world.
4. The fourth generation (1980- present): Personal Computers:

   With the development of LSI circuits - chips containing thousands of transistors on a square centimeter of silicon - the age of personal computer dawned. Windows, UNIX(and its various derivatives), network operating systems and distributed operating systems all appear to the users.
5. The fifth generation (1990-present): Mobile Computers:

   Now, smartphones have become ubiquitous, the competition between the various operating systems is fierce and the outcome is even less clear than in the PC world.

Question 2:

		Parent
After First Folk()	Child1	Parent
After Second Folk()	Child2 Child1	Child3 Parent

From the diagram above, clearly, 4 processes are created.

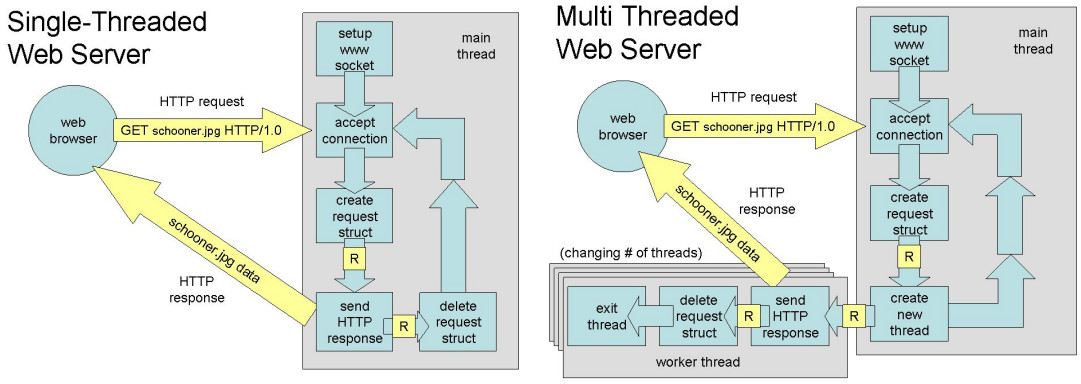
Question 3:

Unsigned 32-bit integer can store up to 2^32 = 4294967296 seconds
1 day = 86400 seconds
So, the unsigned 32-bit integer can store to about 136 years
If the time passed the day, it would be a problem.

Question 4:

1. A Single-threaded Web Server:
   The main loop of the Web Server gets a request, examines it, and carries it out to completion before getting the next one. While waiting for the disk, the server is idle and doesn't process any other process.
2. A Multi-threaded Web Server:
   - A separate thread for each HTTP request
   - Threads to render the pages
   - Threads for user input.

Obviously, the multi-threaded web server has a improvement of the performance.



These two images (I found online) also explains why the performance of multi-threaded web server is better.

Question 5:

1. 99% = 1 - (60%)^n
   n = 9
   16 - 9 = 7MB
2. U = 1 - (60%)^ n2 ,where n2 = 16/3 = 5
   U = 1-0.0776 = 0.9224=92.24%