ITSC 3146 Test 1

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1.	**Where does the CPU retrieve data from?**	memory and storage components
2.	**Permanent memory is also known as what? and what two types does it come in?**	It is non-volatile. 1. ROM - memory is stocked once and cannot be modified 2. read/write memory - data can be read and written from
3.	**What is temporary memory known as?**	voilitile memory, is cleared once the computer is powered off
4.	**What is ram? What two types are there?**	1. SRAM - data is stored indefinitely as long as the computer is not powered off 2. DRAM - data is retained only if it is refreshed periodicallly
5.	**Describe the memory hierarchy**	1. Lowest level is permanent storage such as a disk 2. main memory where a subset of data is stored temporarily 3. cache memory is next and uses SRAM to store frequently used data 4. registers store variables and temporary results for current CPU computations
6.	**What is a key fact about a magnetic disk?**	It has several mechanical components, which is why random access of data is very slow
7.	**What is a supercell?**	In main memory, it is a collection of 1 bit cells
8.	**What two principles does the cache primarily work on?**	Temporal locality spatial locality
9.	**Purpose of Program Count or PC register?**	stores the address of the instruction that needs to be fetched next in stream of instructions
10.	**purpose of the stack pointer register?**	stores the address of the top of the stack

11.	**purpose of the program status word register?**	stores several bits of information that is relevant to current state of the system
12.	**CPU sequence of executing a strea of instructions**	1. fetch an instruction from memory 2. determines the type of instruction to be done 3. fetch some data for the instruction from memory 4. execute the instruction 5. update the Program Counter (pc) register
13.	**What is pipelining**	CPU instruction execution sequence is split up into multiple stages so multiple instructions can make progress concurrently
14.	**What is polling**	the CPU stops what it is doing and asks each device if it is ready
15.	**What is the alternative to polling?**	The I/O device will send an interrupt to let the CPU know it is ready
16.	**What is DMA**	Direct Memory Access, this is used when a large amount of data that needs to be transferred between an I/O device and main memory. IT IS NOT HANDLED BY THE CPU, it is handled by SPECIAL HARDWARE
17.	**what does this line mean? using namespace std;**	tells the compiler to use the standard namespace, which includes features of the c++ standard library
18.	**what symbol is used for cin**	>>
19.	**what symbol is used for cout**	<<
20.	**How does the increment operator work in the prefix form? ++x**	increments the value, and then proceeds with the expression

21.	**How does the increment operator work in the post-fix form? x++**	evaluates the expression and then performs the incrementing
22.	**Does the default case in a switch statement require a break statement?**	No
23.	**abstraction**	the concept of hiding complexity
24.	**In an operating system, policy refers to...?**	refers to the procedures and rules that are used to determine what action to take out of a set of possibilities
25.	**In an operating system, a mechanism refers to...?**	refers to the data structures and operations that are used to complete a service
26.	**In an operating system, user mode is....?**	user mode is a protected mode with no access to hardware
27.	**In an operating system, kernel mode is ...?**	a privileged mode with direct access to hardware
28.	**What are the two styles of architecture for an operating system?**	Monolithic and layered architecture.
29.	**What is a monolithic architecture?**	(all procedures) The entire operating system exists in one program. The entire program runs in kernel mode. Procedures have access to all other procedures making procedure calls efficient. -Very hard to create this kind of architecture and also hard to debug. -Any error could potentially bring down the whole os.
30.	**What is a layered architecture?**	Divided into layers. Each layer is responsible for certain operations.

31.	**What does it mean for an integer type modifier to be signed?**	Can hold both negative and positive numbers
32.	**What does it mean for an integer type modifier to be unsigned?**	Can only hold positive numbers
33.	**What are the sizes of the three different floating point data types?**	float - 4 bytes double - 8 bytes long double - 16 bytes
34.	**What are the naming conventions for variable names?**	1. variables must begin with a letter or underscore 2. Special characters are NOT allowed in variable names 3. numbers can be used in variable names after the initial character
35.	**What is a pointer and how do you declare a pointer?**	It is a variable that stores the address of another variable. You can declare it with the *x
36.	**What does the "&" character do?**	It returns the memory address of a variable
37.	**What does the "*" variable do?**	returns the value of the variable located at the address of the operand
38.	**What is different about the stack and the heap?**	Stack - this is the memory that stores all of your local variables. - Memory management is carried out automatically Heap - Memory IS REQUESTED WHEN THE NEW KEYWORD IS USED. The heap is unused program memory that can be used at runtime to dynamically allocate memory. - dynamically allocated memory on the heap must be manually freed up by using the delete operator when no longer needed.

39.	**What computing development occurred during the 1940s to the 1950s**	vacuum tubes - controls electric currents between electrodes
40.	**What computing development occurred during the 1950s to the MID 1960s**	transistors - this is used to control the current or voltage
41.	**What computing development occurred during the 1960s?**	Integrated Circuits - a set of electronic circuits, it has large amount of tiny transistors
42.	**What was the difference between procedures from the 1940-1950 and the 1950-1960?**	40s-50s: A single group was responsible for the entire operation. Everything was programmed in machine language 50s-60s: programmers and operators became separate people. Basic programming languages such as Fortran was introduced
43.	**What computing development came in the 1950s to mid 1960s**	mainframes - very large computers that take on large computing tasks
44.	**What computing development came in the 1980s**	Real-time systems - software or hardware that works on a time constraint or it will fail. flight control computer for example. - hard real-time systems have catastrophic outcomes if the deadline is not met.
45.	**What computing development came in the late 1960s**	UNIX - multiuser operating system
46.	**What is a process? What does the operating system use them for?**	It is an abstraction that the operating system uses to represent a running program instance. They are used to manage concurrently running programs.
47.		

	What is an embedded system?	This is a system that does not have a user interface. It is a computer that usually has just one function. So this would be the computer in your car or lawn mower.
48.	**What are the states that a process will go through?**	ready running waiting
49.	**What is a preeemption**	when the execution of a running process is interrupted so that another process can be scheduled
50.	**What does the operating system use to maintain information about each process in the system?**	a data structure called process control block
51.	**How is a process created?**	Through a system call - a way for programs to request a service from the kernel of the operating system
52.	**What is a memory image?**	The memory space allocated for a given process
53.	**What is a fork and why do we need it?**	when you call fork you are cloning a process, this new process has its own address space and can take on a task of a different process
54.	**What does the exec family of system calls allow?**	It allows a child process to change its memory image so that it may execute a program that is different from the one its parent executes
55.	**What is the second parameter passed to the execvp system call?**	It is an array of command line parameters to be passed to the new program to be executed
56.	**What header file must be included to get access to the exec system call?**	<unistd.h>

57.	**What are the reasons for a process termination?**	1. process successfully finishes the program 2. process is killed by the user 3. process experiences an error
58.	**What is the purpose of the echo program**	To display whatever is passed to it, used to get customized output
59.	**What happens if a parent process terminates before its child?**	It becomes an orphan and is adopted by the init process
60.	**In a system with multiple processes, what is policy and mechanism?**	policy - when the OS switches to a different process mechanism - how process switching is performed
61.	**What does CIA triad stand for?**	c - confidentiality I - integrity A - availability
62.	**What is a fork bomb**	known as a rabbit virus, but this is a denial of service attack. infinitely creates new processes until the process table is full
63.	**system call**	an entry point into the linux kernel
64.	**wait() system call**	suspends execution of the calling process until one of its children terminates
65.	**What can bash commands be used to do?**	used in the linux terminal to display running processes, kill them or change their priority level
66.	**Bash command renice**	changes the scheduling priority of one or more running processes