CS Topic 2-Computer Organization

Class Assessment December 27th 2012

Mr Trofimczuk-**Answers**

**Instructions:**

* **Time provided for assessment will be: 1hr 10min**
* **Total marks for the assessment is out of a score of 35**
* Test results will be provided as a percentage and sent to your email address by Friday December 30th
* **All electronic devices must be turned off**
* Questions will need to be written on the paper provided

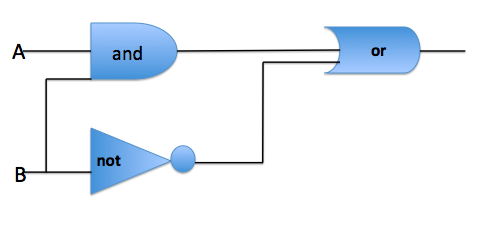
Assessment Questions

1. State one function of the operating system in managing memory *(1 mark)*

* *(1 mark for function stated)*
* *Allocating storage for data and instructions*
* *Keeping track of free and occupied parts of memory*

1. Construct a logic diagram for the Boolean expression: *(4 marks)*

A AND B OR NOT B



1. State one example of application software *(1 mark)*

*Word processor, spreadsheet, database management system, e-mail, web browser, CAD, graphic processing software*

1. The operating systems in the latest mobile phones allows the user to open more than one application at the same time:
2. State three possible applications that might be open at the same time *(3 marks)*

*Internet browser, phone application (making a call), camera application, (taking a picture), MP3 player, E-mail reader*

1. Explain the role of the operating system in the management of these applications *(5 marks)*

***Memory management:*** *The OS allocates a certain portion of the memory for each application. The amount of memory needed by each application may change so the OS will need to be able to allocate when the application no longer needs it.*

***Allocation of processing time for each application:*** *This could involve time-slicing in which each application is given a certain amount of processor time before control is switched to the next application. Alternatively, the OS could use an event-driven model in which control of the processor is passed to the appropriate application as events such as an incoming call, a button press, or an interrupt occur.*

***Coordination of interfaces:*** *The OS determines which application should be notified if a button is pressed and updates the display based on requests received from each of the applications.*

1. Outline the architecture of the CPU *(3 marks)*

*(With brief outlines)*

* *Control Unit (CU),*
* *Arithmetic and Logic Unit (ALU),*
* *Primary memory (Note: in some definitions the primary memory does not belong to the CPU).*
* *Cache*

1. Outline the machine instruction cycle *(4 marks)*

*(four steps that nearly all CPUs use in their operation + Outlines)*

1. *Fetch*
2. *Decode*
3. *Execute*
4. *Writeback*
5. Calculate the following binary numbers to decimal *(4 marks)*:

* 11011
* 10101

*(plus two marks for showing calculations / working)*

* 27
* 21

1. Define Binary *(1 mark)*

*A* ***Binary code*** *is a way of representing* [*text*](http://en.wikipedia.org/wiki/Plain_text) *or* [*computer processor instructions*](http://en.wikipedia.org/wiki/Instruction_%28computer_science%29) *by the use of the* [*binary number system*](http://en.wikipedia.org/wiki/Binary_number_system)*'s two-*[*binary digits*](http://en.wikipedia.org/wiki/Binary_digit) *0 and 1. This is accomplished by assigning a bit string to each particular symbol or instruction. For example, a* [*binary string*](http://en.wikipedia.org/wiki/String_%28computing%29) *of eight binary digits (*[*bits*](http://en.wikipedia.org/wiki/Bit)*) can represent any of 255 possible values and can therefore correspond to a variety of different symbols, letters or instructions.*

1. Define Decimal *(1 mark)*

*The* ***decimal***[*numeral system*](http://en.wikipedia.org/wiki/Numeral_system) *(also called* ***base ten*** *or occasionally* ***denary****) has* [*ten*](http://en.wikipedia.org/wiki/10_%28number%29) *as its* [*base*](http://en.wikipedia.org/wiki/Base_%28exponentiation%29)*. It is the numerical base most widely used by modern civilizations.****Decimals*** *also refer to decimal fractions, either separately or in contrast to* [*vulgar fractions*](http://en.wikipedia.org/wiki/Vulgar_fraction)*. In this context, a decimal is a tenth part, and decimals become a series of nested tenths.*

1. Identify the two types of Data Storage terms for *(2 marks):*

* Volatile memory
* Non-volatile memory

Volatile memory is memory which contains state that is cleared after the process is done running.

Persistent memory or storage which contains state that continues to last even after the process being ended.

Persistent memory is needed because computers often want to continue performing computations on state they were working on earlier. For example, suppose you create a file and then save it.

Outline the way in which data is represented in a computer *(3 marks)*

*Computers work with binary number system that is consist of only two digits zero and one. Inside the computer binary number is represented by an electrical pulse. One means a pulse of electricity and zero means no pulse. All the data enters into the computers first converts into the binary number system. One digit in binary number system is called bit and combination of eight bits is called byte. A byte is the basic unit that is used to represent the alphabetic, numeric and alphanumeric data.*

1. Outline the functions of the following three layers three of cache memory *(3 marks):*

* Level 1 (L1) cache
* Level 2 (L2) cache
* Level 3 (L3) cache

