Computer Science Induction Activity August 2019

Hello and welcome to the computer science department! In order to make sure that we can make lots of progress quickly in September we need you to complete this activity.

Bring this to your first Computer Science lesson in September.

In this subject you will be expected to develop:

- An understanding of and ability to apply the fundamental principles and concepts of computer science including; abstraction, decomposition, logic, algorithms and data representation
- The ability to analyse problems in computational terms through practical experience of solving such problems including writing programs to do so
- The capacity for thinking creatively, innovatively, analytically, logically, numerically and critically
- The ability to articulate the individual (moral), social (ethical), legal and cultural opportunities and risks of digital technology.

You will need to have an interest in:

- The way in which computers work at a fundamental level including hardware, software, the use of data, logical structures and the transmission of data
- Computational thinking. Programming and problem solving
- Legal, moral, ethical and social issues relating to computers

Task One

Download a QR reader to your smart phone (QR Code Reader is a good one). You may find the videos in the following links useful for the next two tasks.

https://www.youtube.com/playlist?list=PLCiOXwirraUC5JC0piwqzACQleHsnkDTP

https://www.youtube.com/playlist?list=PLCiOXwirraUDhcQX2Y1yso6ImXxkQ9sat

Task Two: Hardware Multiple Choice Questions

Answer each of the multiple choice questions in this section.

Question Prompt: 1
Total Points: 1

The central processing unit (CPU) contains...

- [ ] ... the processor, main memory and the cache.
- [ ] ... the processor, secondary memory and the cache.
- [ ] ... the processor, main storage and the cache memory.

Question Prompt: 2
Total Points: 1

Main memory of RAM is used to...

- [ ] ... store programs while they are running and the data used by these programs.
- [ ] ... temporarily store programs while they are running and the files used by these programs.
- [ ] ... temporarily store programs while they are running and the data used by these programs.

Question Prompt: 3
Total Points: 1

Cache is high speed memory in the CPU that is used to store a copy of frequently used instructions and data. It is used to...

- [ ] ... improve the performance of the CPU.
- [ ] ... improve the performance of RAM.
- [ ] ... improve the performance of ROM.

Question Prompt: 4
Total Points: 1

Clock speed is measured in hertz or cycles per second. It represents...

- [ ] ...how many instructions per minute the processor can execute.
- [ ] ...how many instructions per second the processor can execute.
- [ ] ...how many bits of data per second the processor can execute.

Question Prompt: 5
Total Points: 1

The fetch-execute cycle: the process by which a program is...

- [ ] ... run: instructions are stored in main memory, fetched by the processor one at a time, decoded and executed.
- [ ] ... run: instructions are stored in main memory, fetched by the processor, decoded and executed.
- [ ] ... run: instructions are stored in main memory, fetched by the processor one at a time and executed.

Question Prompt: 6
Total Points: 1

Random Access Memory (RAM) is...

- [ ] ... a type of memory that is read-write and volatile. Used for main memory.
- [ ] ... a type of memory that is read-only and non-volatile. Used for main memory.
- [ ] ... a type of memory that is write only and volatile. Used for main memory.

Question Prompt: 7
Total Points: 1

Read Only Memory (ROM) is...

- [ ] ... volatile memory that is hard-coded at the time of manufacture. Stores the start up programs, the boot strap-loader.
- [ ] ... non-volatile memory that is hard-coded at the time of manufacture. Stores the start up programs, the boot strap-loader.
- [ ] ... memory that is hard-coded at the time of manufacture. Stores all programs, the boot strap-loader.

Question Prompt: 8
Total Points: 1

The bootstrap loader is the...

- [ ] ...first program that is loaded into main memory from ROM when a computer is switched on. This will load the operating system from main memory.
- [ ] ...first program that is loaded into main memory from RAM when a computer is switched on. This will load the operating system from secondary storage.
- [ ] ...first program that is loaded into main memory from ROM when a computer is switched on. This will load the operating system from secondary storage.

Question Prompt: 9
Total Points: 1

Volatile memory describes memory that...

- [ ] ... loses its contents when the power is turned off, e.g. RAM.
- [ ] ... loses its contents when the power is turned off, e.g. ROM.
- [ ] ... retains its contents when the power is turned off, e.g. ROM.

Question Prompt: 10
Total Points: 1

Non-volatile memory describes memory that...

- [ ] ... doesn't lose its contents when the power is turned off, e.g. hard disk.
- [ ] ... does lose its contents when the power is turned off, e.g. hard disk.
- [ ] ... doesn't lose its contents when the power is turned off, e.g. RAM.

Question Prompt: 11
Total Points: 1

Virtual memory is...

- [ ] .. part of the hard-disk that is configured to behave like an extension to main memory (ROM).
- [ ] .. part of the hard-disk that is configured to behave like an extension to main memory (RAM).
- [ ] .. part of the hard-disk that is configured to replace main memory (RAM).

Question Prompt: 12

Total Points: 1

Magnetic media is secondary storage such as...

- [ ] ... hard disks, tape and floppy disks.
- [ ] ... hard disks, CDs and floppy disks.
- [ ] ... hard disks, DVDs and floppy disks.

Task Three: Data Representation

Answer each of the multiple choice questions in this section.

Question Prompt: 1

Total Points: 1

Modern computers work in binary because it is easy to represent two states in simple electronic circuits. Binary is a...

- [ ] ... a base 2 numbering system with 2 symbols.
- [ ] ... a base 6 numbering system with 6 symbols.
- [ ] ... a base 10 numbering system with 10 symbols.
- [ ] ... a base 4 numbering system with 4 symbols.

Question Prompt: 2

Total Points: 1

Each digit in binary is called a...

- [ ] byte
- [ ] nibble
- [ ] bit
- [ ] kilobyte

Question Prompt: 3

Total Points: 1

A group of 8 binary bits is called a...

- [ ] ...byte.
- [ ] ...bit.
- [ ] ...nibble.

Question Prompt: 4

Total Points: 1

A group of 4 binary bits is called a...

- [ ] ... bit
- [ ] ... byte.
- [ ] ... nibble.

Question Prompt: 5
Total Points: 1

How many kilobytes are in a megabyte?

- [ ] 1000
- [ ] 1028
- [ ] 1024
- [ ] 1026

Question Prompt: 6
Total Points: 1

How many megabytes are in a gigabyte?

- [ ] 1000
- [ ] 1024
- [ ] 1026
- [ ] 1028

Question Prompt: 7
Total Points: 1

If a computer has only 8 bits to store a value then the last bit of a 9 bit number will be lost. This is called...

- [ ] ...an over error.
- [ ] ...an overflo error.
- [ ] ...an overflow error.
- [ ] ...an underflow error.

Question Prompt: 8
Total Points: 1

Hexadecimal numbers are...

- [ ] ... base 12
- [ ] ... base 14
- [ ] ... base 16.
- [ ] ... base 18.

Question Prompt: 9
Total Points: 1

All symbols displayed in a computer are represented by a code. The computer looks up the symbol matching the code from a list of codes and their associated characters. The list of codes and characters is called the...

- [ ] ... character set.
- [ ] ... character collection.
- [ ] ... character group.
- [ ] ... character assemble.

Question Prompt: 10
Total Points: 1

ASCII uses...

- [ ] ... 7 bits so can provide 127 characters or symbols plus the null character (128 in total).
- [ ] ... 7 bits so can provide 127 characters or symbols.
- [ ] ... 7 bits so can provide 127 characters plus the null character (128 in total).

Question Prompt: 11
Total Points: 1

Unicode uses 16 bits...

- [ ] ... providing over 65,000 possibilities or 32 bits providing over 2 billion possibilities.
- [ ] ... providing over 65,000 possibilities or 32 bits providing over 1 billion possibilities.
- [ ] ... providing over 65,000 possibilities or 32 bits providing over 3 billion possibilities.
- [ ] ... providing over 65,000 possibilities or 32 bits providing over 4 billion possibilities.

Question Prompt: 12
Total Points: 1

A pixel is one dot in an image. The number of bits per pixel determines...

- [ ] ... how many colours each dot can represent.
- [ ] ... how many dots each dot can represent.
- [ ] ... how many shades each dot can represent.
- [ ] ... how many pixels each dot can represent.

Question Prompt: 13
Total Points: 1

The more bits per pixel the greater the...

- [ ] ...pixel depth.
- [ ] ...colour depth.
- [ ] ...dot depth.

Question Prompt: 14
Total Points: 1

The resolution of an image is the...

- [ ] ...number of dots per unit, e.g.the number of dots per inch (usually called dots per inch or 'dpi').
- [ ] ...number of pixels per unit, e.g.the number of pixels per inch (usually called dots per inch or 'dpi').
- [ ] ...number of pixels per unit, e.g.the number of dots per inch (usually called dots per inch or 'dpi').

Question Prompt: 15
Total Points: 1

The sample rate of a sound is the...

- [ ] ...number of times per minute that the sound wave is measured. The higher the sample rate the more accurately the wave is represented.
- [ ] ...number of times per second that the sound wave is measured. The lower the sample rate the more accurately the wave is represented.
- [ ] ...number of times per second that the sound wave is measured. The high the sample rate the more accurately the wave is represented.

Question Prompt: 16
Total Points: 1

The sample interval of a sound is the...

- [ ] ...wave gap between measurements of a sound wave being taken.
- [ ] ...time gap between measurements of a sound being taken.
- [ ] ...time gap between measurements of a sound wave being taken.
