**Unit 2 Revision Questions**

Complete the following in preparation for your assessment next week:

1. Convert the following number to denary: 0010 1110 46
2. Convert the following number to binary: 43 0010 1011
3. Complete the following binary addition: 11010010 + 01001100 1 0001 1110
4. Complete the following binary addition: 00000101 + 10101110 010110011
5. Convert the following negative integer into binary using sign and magnitude: -36 -0010 0100
6. Convert the following negative integer into binary using two’s complement: -45 -0010 1101
7. Convert the following negative integer into binary using two’s complement: -12 -0000 1100
8. Convert the following floating point binary number into denary. The first 8 bits are used for the mantissa and the remaining 4 are the exponent: 0101 1001 0110 5 9 6
9. What are the three main factors that affect the performance of the CPU? How do they affect performance?

**1 Cashe**

* CPU can work very quickly indeed but unfortunately CPU’s can only work when supplied with data. The RAM cannot work at the same speed.
* To overcome this the CPU’s cashe memory will not just copy the instruction needed at that time, instead it will also copy the continuing instruction.
* Cashe memory has read speed like the CPU and is therefore much faster.

**2 Number of cores**

Within the CPU we have one or more processing units, and each is called a core. Core contains registers, ALU and control unit. Commonly computers have 2 cores or 4 cores. More cores mean more instructions can be done.

**3 Clock speed**

The clock speed represents how much cycles per second can be executed. Can also be referred to as clock rate. Clock speed/Clock rate is measured in gigahertz (Ghz)

1. Name three registers within the CPU and explain their purpose.

**The Accumulator (ACC)**

The accumulation of the CPU is a register which temporarily holds data values in logic and mathematic equations.

**The Program Counter (PC)**

Program counter holds the address of the instruction which is currently being executed. The program counter increases by 1 each time an instruction is fetched.

**The Memory Address Register (MAR)**

The memory address register holds the place of data which needs to be accessed.

1. What is an instruction set?

Model of the computer

1. How many colors will an image with a color depth of 1 bit be able to represent? Explain the reason for your answer.

1 bit will produce 2 colors. Because each time the value is doubled. 2 bit = 4 colors, 4 bit = 8 colors

1. Explain how CPU architecture in mobile and embedded systems is different to CPU architecture in PC’s

Embedded system is used to complete multiple tasks. Mobiles can also adapt to embedded systems in order to complete tasks.

1. What is pipelining and what is the limitation of pipelining?

Pipelining is when you do more than one task at once. For example, decoding something and executing something else at the same time. Limitation = only works if CPU knows what the next task is. Also, if set up wrong will make error from start to finish.

1. What is image resolution and how do we calculate it?

Formula = width(pixels) x height (pixels)

1. Describe the ASCII character set.

Runs with 7 bit and has 128 characters has letters a – z in upper and lowercase and numbers 0-9

1. What is the limitation of ASCII?

has 128 characters whereas UNICODE has 256 characters

1. What is the difference between arrays and lists?

Arrays contain data of the same data type. Whereas lists use different data types

1. What are three features of GUIs?

* Easy exchange
* Easier for beginners
* Slower than command line

1. Explain the differences between Lossy and lossless compression.

Lossless – reduces file same and quality remains same.

Lossy – reduces file size and permanently removes data.

1. How is image data stored and represented? How does this impact upon the image and its use?

Binary is used using 0 and 1 to create pixels. Each pixel contains 2 digits. Monochrome is used to represent black and white. Eg. 0 = black and 1 = white.

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**Hints! Think about:**

* **Resolution (how images are made up, how we increase quality, why we would increase/decrease quality for different purposes and the effect this has on file size)**
* **Bit depth (number of bits per pixel and the number of colors that can be represented when increasing bit depth – how does this affect file size when we increase bit depth?)**
* **Bitmap vs vector image (explain the differences in how they are created, the file size and typical uses/suitability)**
* **Compression (image compression is used to reduce the amount of memory an image takes up, lossy vs lossless)**