**Task 5 (D1) unit 19**

Draw a diagram showing how system buses (data bus, control bus and address bus) connect the processor to the memory and I/O devices (peripherals) with an explanation of, for example, how a document is printed or how a file is retrieved from disk.

**Control bus**

**Address bus**

**Data bus**

**Control bus**

**Address bus**

**Processor (CPU)**

**Ram**

**Data bus**

**Control bus**

**Input/output controllers**

**Control bus**

**VDU**

**Disk I/O** controller

**Key board**

**Printer**

**How a document is printed**

To print a document from the software application, it must be able to communicate instructions via a printer driver, so the communication interface can be connected to a printer and computer system. Firstly, you will need a peripheral device connected to a computer because it helps to enlarge the computer ability. So the computers require to communicate with the peripheral device using the address bus, data bus and control bus. So the control bus commands instruction to get the status of the printer then the printer might have busy flag or bit will say if the printer is prepared to obtain data from the buses. For example , the busy flag is like a counter representing whether the printer is being used; if it is being used it will show as ‘1’ but if the it’s a ‘0’, then the CPU can direct data. After the printer will identify a queuing system so that the printer isn’t busy with lots of request and the printer will use the method of spooling to avoid the problems by saving it to a disc location where it is kept and placed in a printing job queue.

So if the communication is established, then the instruction to the printer can be transmitted in many ways. After the CPU will then transfer data from the memory to the printers’ buffer. The buffer is memory which is connected to the printer and make the printer to print a document. So the main purpose of the buffer is to help the communication between the CPU because it stores data that has been sent to the computer printer to print. However, it is unable to print because another print job is taking place. The print buffer permits the CPU to continue functioning smoothly even when operating something different while printing at the similar time. We see this when we send a page to print and there are extra pages being printed and so it prints the page in the order of how it was sent from the computer, when this happens the printers busy flag will be set to ‘1’ in which allows the CPU to operate something else.

In order to make the printer functioning it has to decode instruction from the computer system into commands that can be directed to its different working parts. For example numerous printers use the method of description language, a code that tells the precise instruction to the printer so it can create the suitable marks on the page. Since, many printers can give feedback to the users such as when the paper has run out and the message is sent back to the driver to notify the user of the actual problem.

Lastly, to make the printer work it will use polling method to function with the CPU because it has to judge when to obtain a document from printer and so the polling method is frequently used for input/output. The CPU will check the status of the I/O device (printer’s busy flag) on a constant time until when the device is prepared. When the file has been printed the page, will then reset the busy flag to ‘0’. At this point the CPU in the computer system will then poll the printer to check for extra pages to print and this is how a printer prints a file.

**References**

<http://en.wikipedia.org/wiki/Polling_(computer_science)>

kerboodle book AS computing