Victoria University
of Bangladesh

Assessment Topic:

Mid Assessment

Course Title: Computer Peripherals and Interfacing

Course Code: CSE-333

Submitted To:

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1. a)

Computer Interfacing: The process of connecting Peripherals with the microprocessor for transferring instructions and results is known as interfacing. Computer interfacing refers to the process of connecting two or more devices or systems so that they can ~~comuni~~ communicate with each other and exchange information or data. In other words, interfacing enables different ~~def~~ devices or systems to work togetheseamlessly.

Some examples: # USB Interface
HDMI Interface
Ethernet Interface
Blue tooth Interface
MIDI Interface
Serial Interface
Parallel Interface

Computer Peripherals: Computer peripherals refer to any devices or hardware components that can be

attached to a computer to enhance its functionality or expand its capabilities beyond what the central processing unit (CPU) can provide. Peripherals can be internal and externals and include devices such as input devices, output devices, storage devices, communicatio devices and multimedia devices.

Examples:

Input devices: keyboard, mouse, scanner

output devices: printer, monitor, speakers

storage devices: Hard drive, usb flash drive

Commincation devices: modem, network adapter

Multimedia devices: webcam, microphone, digital camera.

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1. b) **Interrupt:** Interrupts are signals that allow external devices or software to interrupt the normal program execution flow and request the processor's attention to perform a specific task or service.

Example: Let's say we have a program that is continuously monitoring a temperature sensor and displaying the temperature on an LCD screen. The program runs in a loop, continuously reading the sensor value and updating the LCD display.

However we also want to be able to detect if the temperature exceeds a certain threshold and trigger an alarm if it does. To do this, we can use interrupts.

We can setup ISR that is triggered when the temprature sensor value exceed. The ISR can sound an alarm or take other appropriate action.

The program can continue to run in a loop, but with the addition of an interrupt handler, it can be interrupted when to perform tasks. This allow system to respond in real-time without slowing down the program.

2. a) Source of Interrupts: There are three source of Interrupts.

Hardware-based interrupt: An external hardware applying voltage/signal to the INR pin of the microprocessor, which indicates that the external device, such as a printer or a keyboard, requires service.

Software-based interrupt: Execution of the interrupt instruction, INT.

Example: INT type number.

Internal Interrupts: Some error condition produced by the execution of an instruction.

Example: ~~De~~ Divide-by-zero interrupt.

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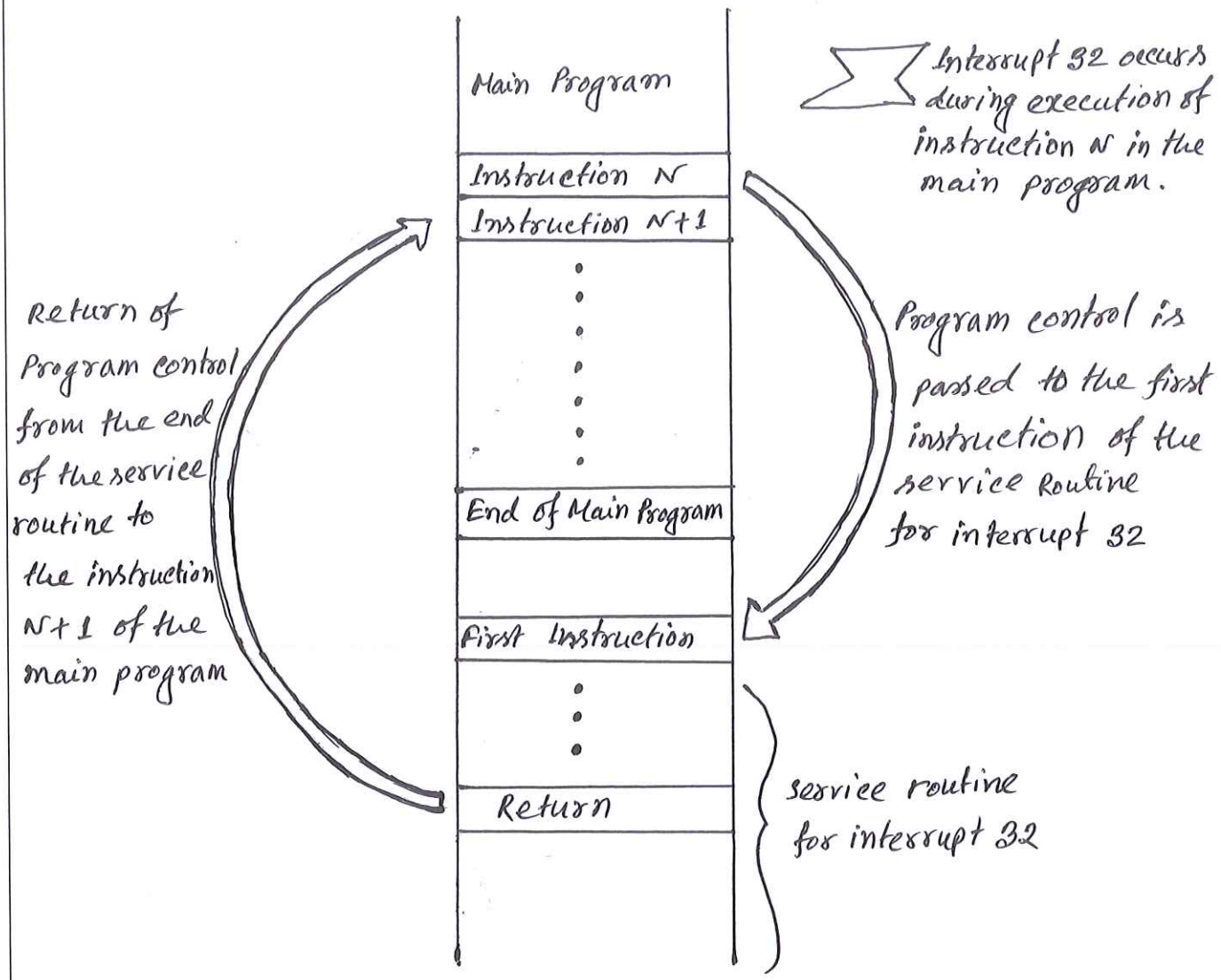
2.b)

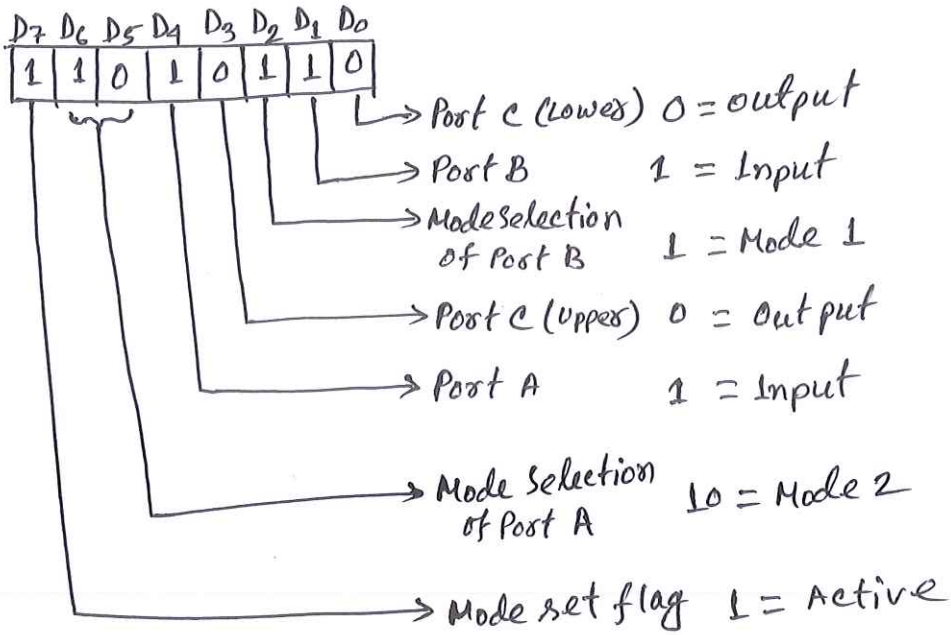


When an interrupt signal occurs, the MPU must suspend what it is doing in the main part of the program and pass control to a special routine ISR (the interrupt-service routine) that performs the function required by the external device.

2.c) Explaining control word of "11010110"

We know that depending control word operation mode can be Bit set reset (BSR) mode or Input-Output mode.

Here,



$D_7 = 1$ that is why this control word defined the operation mode is input-output mode. next two bit D_6 & D_5 represent the mode of Port A. So the mode will be mode 2. D_4 represent I/O of Port A. Here 1 = Input. D_3 represent port-C (upper) I/O status. Here 0 = output. D_2 represent mode of port B. Here 1 = Mode 1. D_1 represent port B I/O status. Here 1 = Input. Finally D_0 represent port-C (lower) I/O status. Here, 0 = output.

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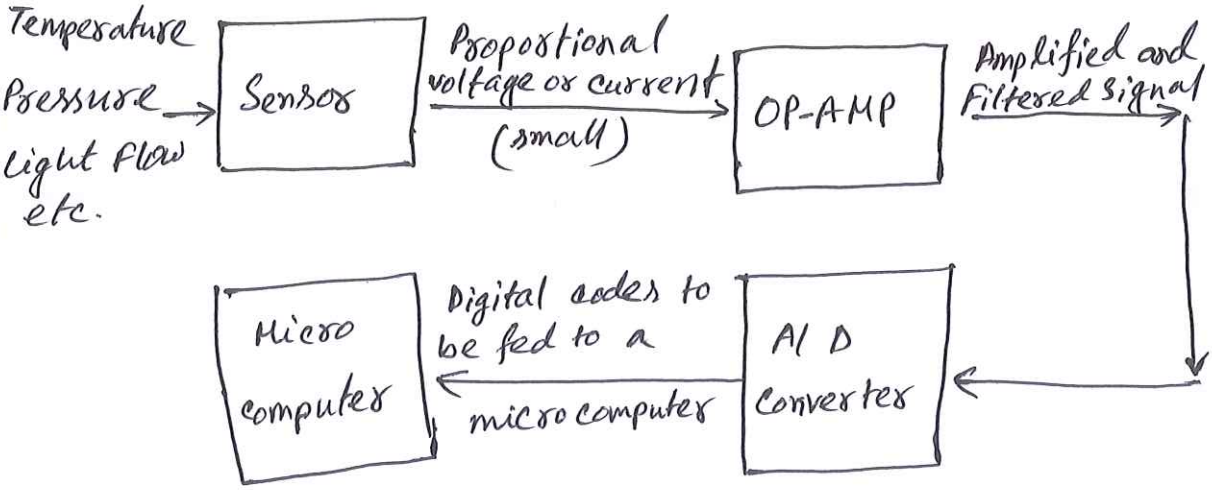
3. a) Analog Interfacing is the process of connecting analog devices or signals to a digital system or processor. The basic concept of the analog interfacing is to convert analog signals to digital signals, which can be processed by a digital system or processor.

Analog signals are continuous and vary in amplitude or frequency over time, whereas digital signals are discrete and have only two states: 0 and 1. To interface analog signals with a digital system, an analog-to-digital converter (ADC) is typically used to convert the analog signal.



Analog Interfacing

3. b) Interrupt vector Table: The interrupt vector table plays an important role in managing interrupts in a microprocessor or microcontroller-based system, allowing for efficient handling of interrupt requests and ensuring the proper execution of ~~intress~~ interrupt service routines.

Interrupt Service Routine: Interrupt service routine (ISR) also known as interrupt handler, is a program that is executed in response to an interrupt request. When an interrupt occurs, such as a hardware or software interrupt, the processor stops executing the current program and transfer control to the appropriate service routine.

The overall flow of interrupt handing in a computer system involves several steps:

i) An interrupt occurs, causing the processor to stop executing the main program and begin executing the appropriate service routine.

ii) The service routine performs it tasks, which may involve reading data from hardware devices, updating system state, or sending data to output devices.

iii) Once the service routine completes its tasks, ~~which may involve~~ it returns control to the main program, which resumes execution as if the interrupt had not occurred.

iv) The processor continues executing the main program until the next interrupt occurs, at which point the process ~~keep~~ repeats.

The IVT and ISR work together to enable the efficient handling of interrupts in a computer system, allowing the system to respond quickly to time-critical events and maintain overall performance.

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3. c) Each vector requires 4 consecutive bytes of memory for storage.

Therefore, its address can be found by multiplying the type number by 4.

Since, CS_{150} and IP_{150} represent the words of the type 150 interrupt pointer, we get,

$$\text{Address} = 4 \times 150 = 600$$

Converting to binary form,

$$\text{Address} = 1001011000_2$$

Converting to Hex form,

$$\text{Address} = 258_{16}$$

Therefore,

IP_{150} is stored at 00258_{16}

and CS_{150} is stored at $0025A_{16}$