MODULE H SOFTWARE · H6

Interrupts and the interrupt service routine

Original practice questions · 20 marks · ~25 minutes · Cambridge 0478 syllabus 4.1.4

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **20 marks**.

1

Total: 5 marks

(a) Define the term **interrupt**. **[1]**

(b) Tick (✓) **one** box in each row to show whether each event generates a hardware interrupt or a software interrupt. **[4]**

Event	Hardware interrupt	Software interrupt
A program tries to divide a number by zero		
The mouse is moved		
Two processes try to access the same memory location		
A key is pressed on the keyboard		

2 **Total: 3 marks**

A receptionist at a hotel uses a computer to type guest details into a booking program. A second program on the same computer is calculating the average price paid for a room.

(a) The receptionist presses the key for the letter M. An interrupt is generated. State what the receptionist would see once this interrupt has been handled. **[1]**

(b) The second program tries to divide a total by zero. An interrupt is generated. State **one** likely result of this interrupt. **[1]**

(c) State the name of the code that is run to handle an interrupt. **[1]**

3 **Total: 4 marks**

(a) Tick (✓) **one** box in each row to show whether each statement about handling interrupts is true or false. **[4]**

Statement	True	False
The processor checks for interrupts after each fetch-decode-execute (FDE) cycle		
Every interrupt is handled straight away, whatever its priority		
When a task is paused to handle an interrupt, the values in its registers are saved before the interrupt is handled		
When the interrupt has been handled, the paused task starts again from its first instruction		

4 **Total: 2 marks**

A processor is running a task. An interrupt is generated that has a **lower** priority than the task.

(a) Describe what happens to the task **and** to the interrupt. **[2]**

5 **Total: 6 marks**

An architect's computer is creating a detailed 3D image of a new building. This will take several hours. While it is running, the architect moves the mouse. The interrupt this generates has a **higher** priority than the 3D image task.

(a) Describe how the interrupt is generated and handled, and how the 3D image task then carries on. **[6]**

Total for this worksheet: 20 marks