

DIGITAL LOGIC CIRCUITS

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On behalf of The World Association of Technology Teachers

W.A.T.T.



World Association of Technology Teachers

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DIGITAL LOGIC EXAMINATION QUESTION

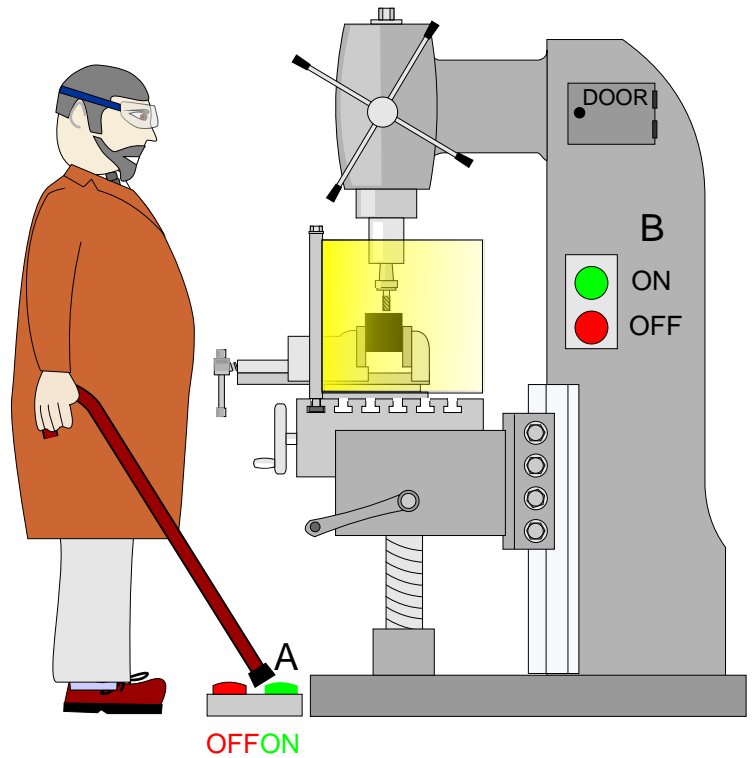
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1A. A metal cutting milling machine has two switches, any one will allow the cutter to run. The first switch is on the side of the machine and the second is a foot operated switch.

However, the machine has two micro-switches (used as safety devices) if any of these is released the cutter will stop. The first micro-switch is on a guard, if this is opened the machine will stop. The second micro-switch is on a door which allows access to the moving mechanism of the milling machine. If this is opened the machine will stop.

The micro-switches are normally logic '1' (true, high, on) when pressed.

Draw the logic diagram for this machine.



1B. What moving parts would you expect to see behind the door leading to the internal mechanism of the milling machine? Why would access to this area be dangerous if the machine is working at the same time?

1C. Is having an ON and OFF switch on the floor a good idea? How would you improve the design of the switch to make the machine safer to use?

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1D. The room has two emergency stop buttons at either end of the workshop. If either of these are pressed all machinery in the room will stop. Draw the new logic circuit for this arrangement of buttons and switches.

ON / OFF SWITCHES

MICRO-SWITCHES

MACHINE OFF

EMERGENCY STOPS