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Final Project

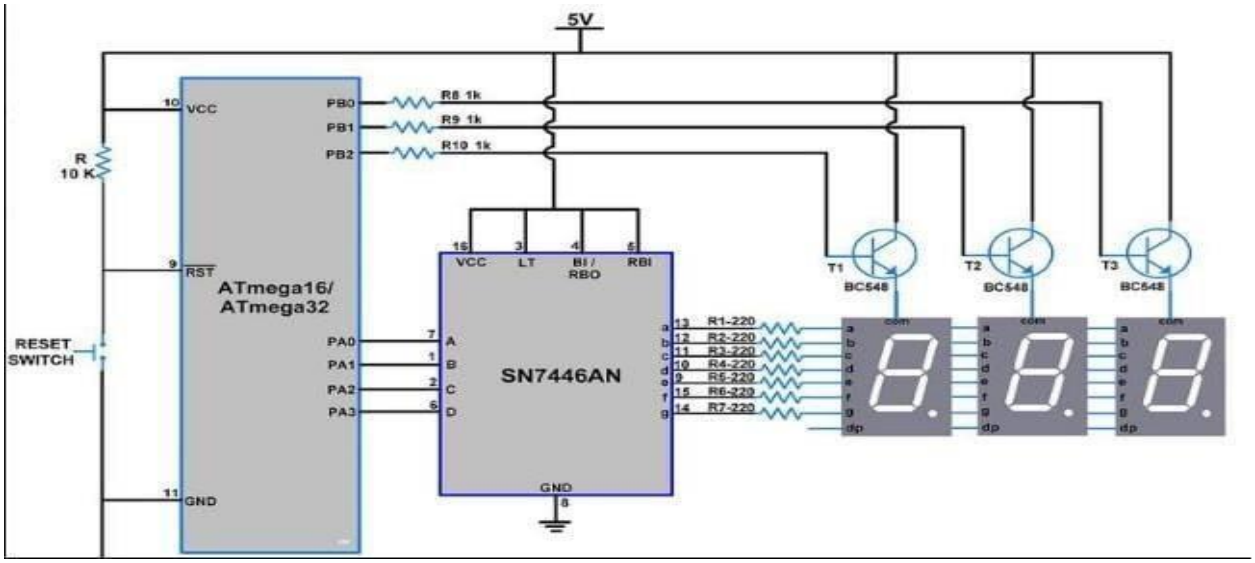
Implement the following **Stop Watch** system with the specifications listed below:

1. Use **ATmega 32** Microcontroller with frequency **1Mhz**.

2. Configure **Timer1** in ATmega16 with **CTC** or **Tim0 Overflow** mode to count the Stop Watch time.

3. Use six **Common Anode** 7-segments.

4. Connect the six 7-segments in the project using the **multiplexed technique**. You should use **one 7447 decoder** for all 7-segments and control the enable/disable for each 7-segement using a **NPN BJT** transistor connect to one of the MCU pins. Like the below image:



Note: The above image is just to illustrate the basic idea about the multiplexed 7-segments. Use The common anode decoder 7447 instead of the IC in the image.

5. We can connect more than one 7-segment display by using the Multiplexing method. In this method, at a time one 7-segment display is driven by the Microcontroller and the rest are OFF. It keeps switc hing the displays using transistors. Due to the persistence of vision, it appears as a normal display.

6. Connect 7447 decoder 4-pins to the first 4-pins in PORTC.

7. Use first 6-pins in PORTA as the enable/disable pins for the six 7-segments.

8. Stop Watch counting should start once the power is connected to the MCU.

9. Configure **External Interrupt INT0** with **falling edge**. Connect a push button with the internal pull-up resistor. If a falling edge detected the **Stop Watch time should be reset**.

10. Configure **External Interrupt INT1** with **raising edge**. Connect a push button with the external pull-down resistor. If a raising edge detected the **Stop Watch time should be paused**.

11. Configure **External Interrupt INT2** with **falling edge**. Connect a push button with the internal pull-up resistor. If a falling edge detected the **Stop Watch time should be resumed**.

Thanks, and Good Luck

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