





Q_1a: Draw Schematic

Ans: Done. It is listed on page 1&2.

Q_1b: Is PORTA overloaded or is there some "slack" left in the current specification?

Ans: No. It will not be overloaded. From ATmega128 datasheet (Page. 319), sum of Port A0 to A7 should not exceed 100mA.

Therefore, each port can only have $100/8 = 12.5\text{mA}$ at most, which is enough for this circuit.

And in reality, each port(A0 - A7) will not produce that much current but is slightly little than that.

Q_2: How can you know that the LED segments will be visible?

Ans: Because PORTB(bit7_PWM control) is always driven low in order to saturate the PNP transistor and make LEDs at the full brilliance. What's more, the base current: 2mA, will make sure that we get in the saturation status and make the collector current is close to 100mA.

Q_3: Is the Mega128 total port/device current capacity exceeded?

Ans: No, the total current in every port is not exceeded. And the reason is same as Q_1b.

Not to mention that PortB is only used of 4 outputs.

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