



Hands-on Internet of Things Specialization

IoT Devices

Week 2

Question 1:

Which are major components of IoT systems?

All of the options are correct

Question 2:

What recent advents have spurred the growth of IoT?

All of the options are correct

Question 3:

A capacitor is an electronic component that is designed to resist the flow of electricity in a circuit.

False

Question 4:

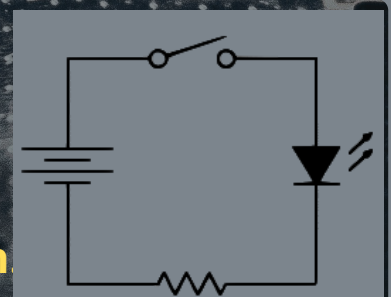
Why is a circuit consisting of just a battery and a wire connecting its two terminals a bad idea?

This is a "short-circuit" which could cause excessive heat or fire.

Question 5:

What is the most likely circuit represented by the following circuit diagram?

LED controlled by a switch.





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Question 6:

What do AC and DC refer to in the context of IoT?

Alternating Current vs Direct Current.

Question 7:

What is the voltage and current if I connect four 3V 1500mAh batteries in series?

12V, 1500mAh

Question 8:

Select the components that can help you maintain a desired voltage level in a circuit. (Select all that apply)

Buck converter Boost converter Voltage regulator

Question 9:

Oral-B has hired you to create a "smart manual toothbrush" that will measure a user's brushing habits (how hard they brush, if they brush up and down or side to side). Which of the following components would be most useful in detecting the brushing motion? (Select all that apply)

DNS



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Question 10:

How does PWM allow a digital circuit to make a motor run at half-speed?

Power is oscillated on and off with a 50% duty cycle.

Question 11:

What is "noise" in the context of electricity?

Undesired variations in the voltage level.

Question 12:

In the "water" analogy for electricity, what are each of the following electrical concepts analogous to?

Match each numbered item 1 through 4 with a lettered option A through G. For example, you could type the answer "1A, 2B, 3C, 4D" to match 1 with A, 2 with B, and so on. You will not use all of the letters.

1. voltage, 2. current, 3. capacitance, 4. resistance

A. depth, B. elasticity, C. water temperature D. water flow, E. constriction, F. water pressure, G. salinity

1F, 2D, 3B, 4E

Question 13:

What is a "data sheet"?

A document that describes the operational behavior of an IC or other electrical component.



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Question 14:

Some large farms use automatic sorting machines to sort produce from the field into different bins based on their ripeness. Please refer to this example.

What electronic components would most likely be used to sort the produce correctly? (Select all that apply)

- **Color sensor**

- **Servos**

Question 15:

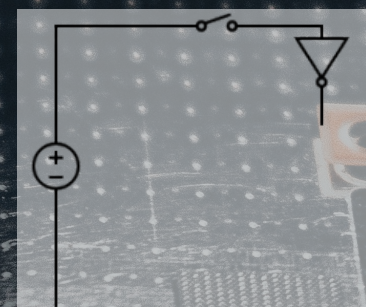
You just bought a new Integrated Circuit (IC) and you want to incorporate it into your circuit. You look at the pinout diagram and see one pin named VCC. What does VCC mean and what is its primary function?

Voltage input - how the IC gets electrical power.

Question 16:

Refer to this circuit:

(imagine there's some additional circuitry after the logic gate). When the switch is open, what is the output from the NOT gate?



non-deterministic.



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Question 17:

What is a common circuit used to remedy non-determinism in circuits? (Select all that apply)

- **Pull-up resistor**
- **Pull-down resistor**

Question 18:

What does an op-amp do?

Amplify a signal

Question 19:

Doors R Us has hired you to make a circuit to control an industrial warehouse door (heavy steel). The door should be lowered via a large motor when an operator hits the "Down" button, but for safety reasons if the laser sensor detects an object is under the doorway then the door should NOT move when the operator hits the "Down" button. Which "common circuit" should you use to prevent the door from closing if someone is underneath the door?

And gate



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Question 20:

Silicon is a ____ when pure, but to make ICs, you can perform a process called ____, to etch circuits into silicon.

insulator, doping

Question 21:

Rahim is a electronics hobbyist and wants to make a simple circuit to control some LED lights in his room. He took CS 498 IoT and heard that integrated circuits are awesome, so he plans to design and fabricate a custom integrated circuit for his project. Give a reason why Rahim should **NOT** do this for his project.

High initial cost of fabrication

Question 22:

Look at the data sheet and answer the following question.
What pin number (not letter) corresponds to the output pin of the logic gate?

4

Question 23:

Look at the data sheet and answer the following question.
What is the minimum recommended supply voltage to use in this IC?

2.0V