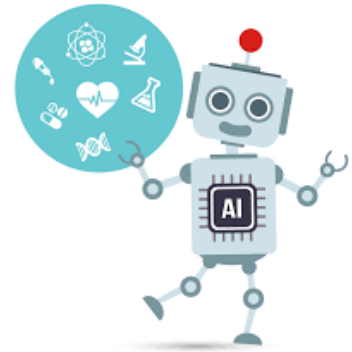


## Computer Engineering

Computer Engineering is a type of engineering that involves designing computers, computer systems, the hardware and software. Computer engineers think about how computers work, how to improve them, and where we use them.

### Artificial Intelligence and Machine Learning activity:

**Artificial Intelligence** means that a computer is capable of performing tasks normally requiring human intelligence. **Machine learning** is the ability for the computer to learn and improve from experience. You can also train it. An example would be a computer having several scrambled words with their unscrambled equivalent and learning how to unscramble any word.



Unscramble the following words:

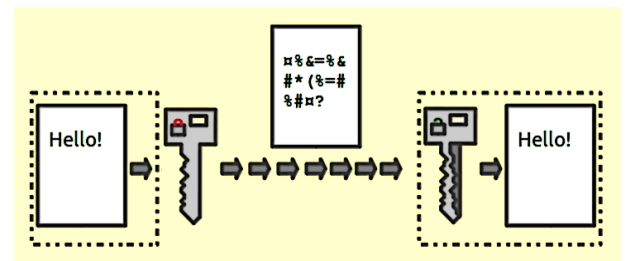
obsrtico: \_\_\_\_\_ glimtorah: \_\_\_\_\_

antiring: \_\_\_\_\_ aceminh : \_\_\_\_\_

bohraemdrot : \_\_\_\_\_ adasabet : \_\_\_\_\_

### Cryptography activity:

**Cryptography** is widely used by Computer Engineers to make sure that our data is safe during communication. Computer Engineers **encrypt** the data using a **key**, so that the data is hard to read and not understood without it. Once the data is received by the right user, they **decrypt** it to make it readable again.



### Caesar Cipher:

This is our key:

Plain	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
-------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Encrypted	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
-----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

The word CAT becomes HFY.

**Now Try:**

Plain text: "Hello World"  
 Encrypted: \_\_\_\_\_

Plain text: \_\_\_\_\_  
 Encrypted: "Gnsfwd nx ozxy tsjx fsi ejwtx"

Plain text: "Alan Turing"  
 Encrypted: \_\_\_\_\_

Plain text: \_\_\_\_\_  
 Encrypted: "Mfw lwnaj"

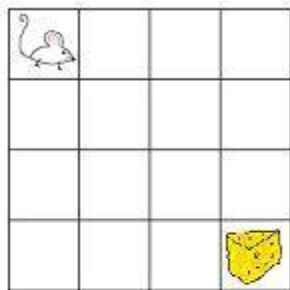
Plain text: "World Wide Web"  
 Encrypted: \_\_\_\_\_

Plain text: \_\_\_\_\_  
 Encrypted: "Mjcfijhnrfg"

Write a code using arrows:

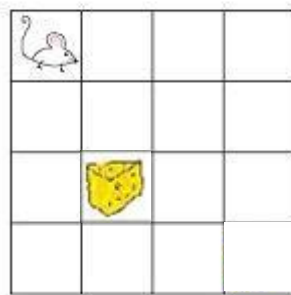
**Coding** is another word for **programming**, an essential part of being a computer engineer. Programs are simply instructions that are executed by a computer to perform certain tasks.

**Find the code**



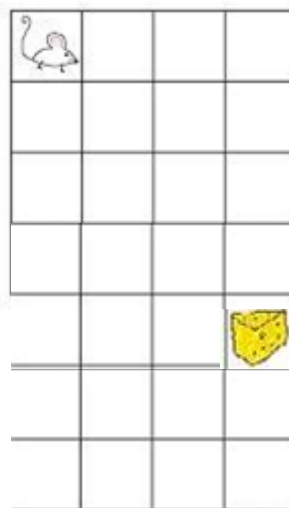
1. → → ↓ ↓ ↓
2. ↓ ↓ → ↓ → →
3. → ↓ → → ↓ →
4. → ↓ → ↓ → → ↓

**Find the code**

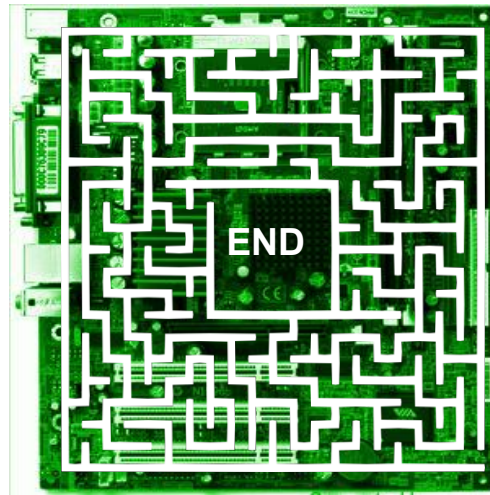


1. → → ↓ ← ←
2. → → → ↓ ↓ ↓ ← ↑
3. ↓ ↓ ↓ → → ↑ ←
4. → → ↓ ↓ ↓ →

**Write the code for the**



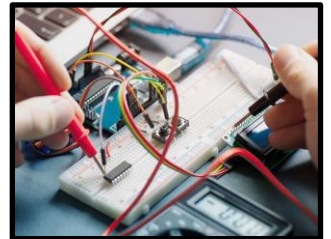
Navigate the Motherboard!



← START

## Electrical Engineering

Electrical Engineering involves working on electrical systems and hardware, specializing in designing and working on systems that use electricity, electronics, and electromagnetism.



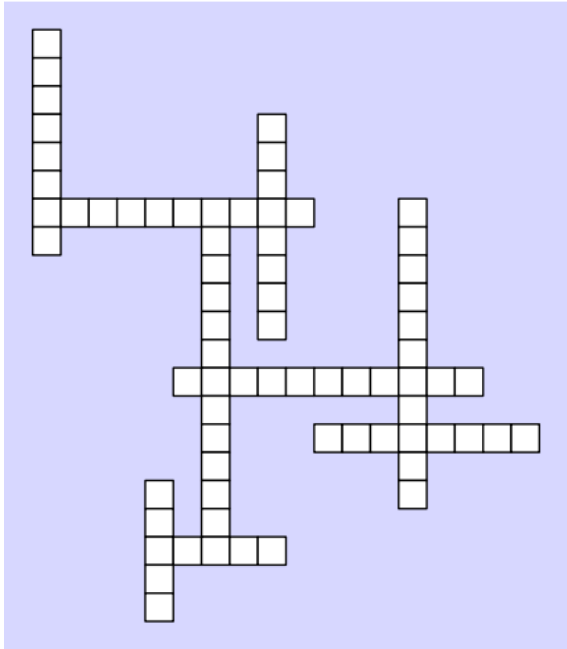
Keyword Word Search

Keyword Word Fill in

R A L F S T I C N F I W L X F T F O Q S  
 E F R I C E D P I G C L I J D N S P N G  
 M H V O I L J K L G K S V P L V O P E Y  
 R M S I T E N G A M O R T C E L E N X M  
 O Q Q J O C I R B R E L D I Z K E B I L  
 F X I K B O U F E D F E R U U R D C K R  
 S O C R O M U D O L S N Z U A C R J G O  
 N T X F R M T I N I E I E T A O R M R T  
 A R L N P U D X G O D C O B C F H I B O  
 R A Q F W N L N E X C R T O A G I Z C M  
 T N I O M I R E W O P I N R N T O Q N Z  
 W S N R G C E R L T U T M I I P T F I P  
 S I R Y A A O Y Q G R T R E V C X E V C  
 A S W S M T V W V O F E W H S Z I M R C  
 T T Q W S I S X L F E R A D I O U T X Y  
 R O Y I U O Q L K N P H Y S I C S D Y Z  
 W R S R T N E I I E L E C T R O N I C S  
 A E H I D R N G R O T I C A P A C W W F  
 R Y U N S P N Q A T M Z I Y U Y F N Q S  
 E Y S G W E Z A G D R Q K S A P R Q D Q

BATTERY  
 CAPACITOR  
 CIRCUITS  
 DESIGN  
 DIODE  
 ELECTRICITY  
 ELECTROMAGNETISM  
 ELECTRONICS  
 ENGINEERING  
 GENERATOR  
 LOGIC  
 MICROCONTROLLERS

MOTOR  
 PHYSICS  
 POWER  
 RADIO  
 RESISTOR  
 ROBOTICS  
 SEMICONDUCTOR  
 TELECOMMUNICATION  
 TRANSFORMER  
 TRANSISTOR  
 WIRING



**5 Letters**  
 power  
 wires

**8 Letters**  
 circuits  
 resistor  
 robotics

**10 Letters**  
 transistor

**11 Letters**  
 electricity  
 engineering

**13 Letters**  
 semiconductor

Word Ladder:

Change one letter at a time to get from the starting word to the target word. Each word in between must be a real one.

Example: COLD → CORD → CARD → **WARD** → WARM

**Now Try:**

VOLT →     →     →     →     →     → WATT  
 AMPS →    →     →     → OHMS

**Volt:** Unit of Voltage  
**Amps:** Unit of Current  
**Ohms:** Unit of Resistance  
**Watt:** Unit of Power

Story:

Connect the dots;

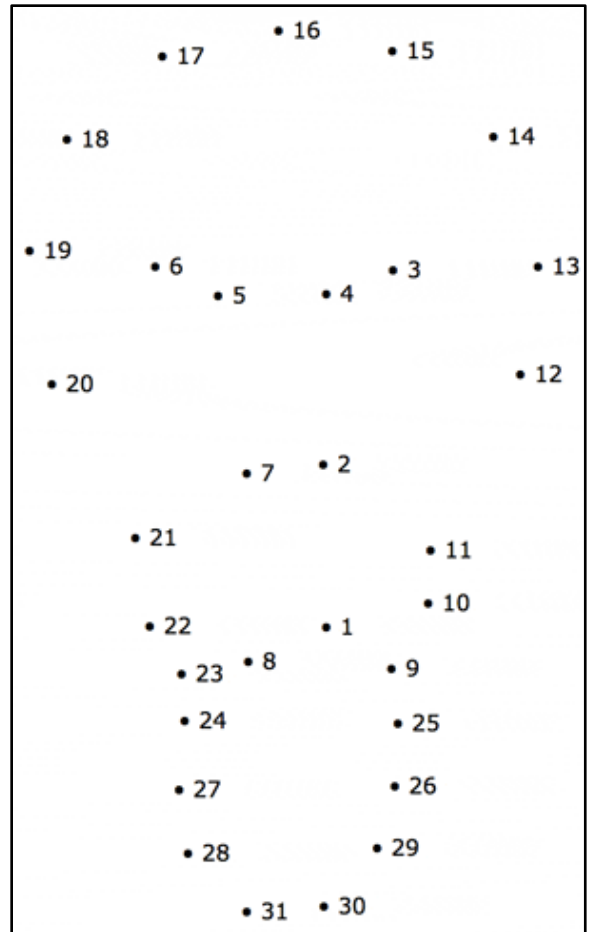
You glance outside your window. There's a thunderstorm going on outside. You try to turn on your lamp to make your room feel warmer, but it won't budge! You flip the

**switch** several times. You unscrew the bottom of it to replace its **battery**. As soon as you switch on your lamp your whole room suddenly gets dark except the tiny light shining from your lamp. The **electricity** went out!

You run downstairs and ask your mom what happened. Your mom is an electrical engineer and an expert on electricity. She lights a candle and says that she has a theory. She thinks the lighting strike might've caused excess **voltage**. Voltage, she explains, is the electrical force that drives the **current**. You look at her a little cluelessly. She then tells you that current is the flow of electric **charge**. You sigh. She then says that charge can be positive or negative and is the property of the particles. She then says not to worry! She has a backup **generator**. It is able to change different types of energy into **electrical energy**!

Fictionary:

Draw what you think these look like in terms of electrical engineering:



Electromagnet:

Resistor:

Generator: