RING Cybersecurity Curriculum Review Moraine Valley CC – March 21, 2025

RING

Regions
Investing in the
Next
Generation

RING Fun Facts

USERS

Utilized by any US or US territory public, private, or homeschool educators

COST

Provided at no cost through grants by the NCAE-C program office at the National Security Agency

DEVELOPERS

Created by a coalition of Center of Academic Excellence (CAE) universities and non-profit organizations

STANDARDS

Created using National Cryptologic Foundation Cybersecurity Curriculum Guidelines (CCG) and CAE Cybersecurity Foundational Knowledge Units (KU)

Are There Online RING Classes?

YES! Free online classes are available for high school students.

Online RING Cybersecurity Classes:

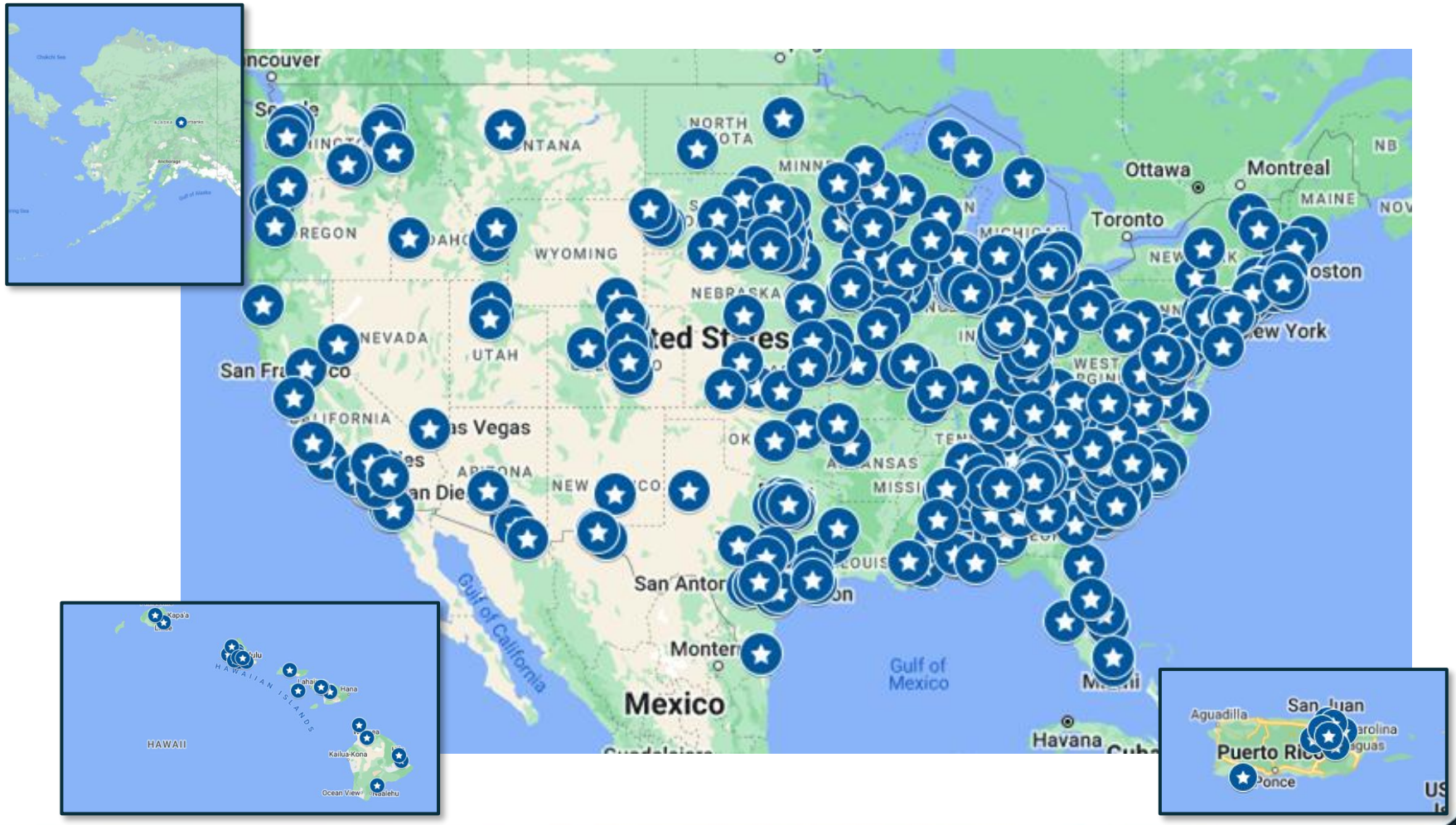
- **Full Academic Year**
- **Single Semester**
- **Summer Semester**
- **Dual Credit Offered**

Interested students can receive course options and information at https://www.caeepnc.org/ring

How Many Educators Use RING?

Over 1,260 US and Puerto Rican educators use the RING curriculum!

"As a CTE high school teacher who has been in education for over 20 years, I have to say that I am so impressed with this curriculum. The content, integration with Google for Education tools and sequencing are completely on point."
-KY Public School Teacher



What Guidelines and Standards Are Used in RING?

#1 Cybersecurity Curriculum Guidelines (CCG)

- **Ethics**
- **Establishing Trust**
- **Ubiquitous Connectivity (Networking)**
- **Data Security**
- **System Security**
- **Adversarial Thinking**
- **Risk**
- **Implications**

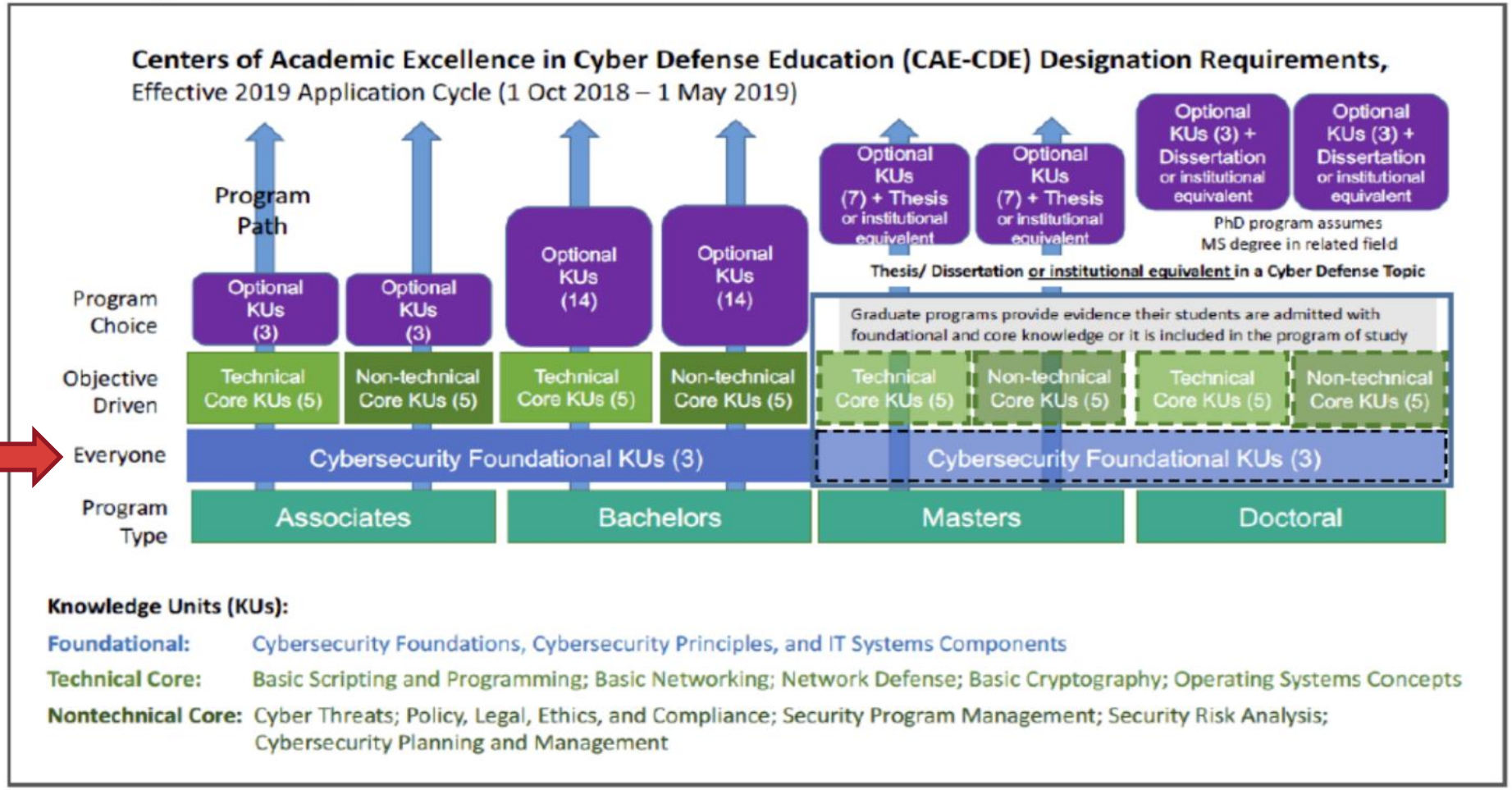
"Guidelines created to encourage curriculum providers, teachers, and industry to create curriculum designed to inspire high school students to pursue a profession in cybersecurity, as well as develop thinkers with a cybersecurity mindset that will enhance any profession they pursue."[1]
(National Cryptologic Foundation)

[1]https://cryptologicfoundation.org/what-we-do/educate/high-school-cybersecurity-curriculum-guidelines.html

What Guidelines and Standards Are Used in RING?

#2 CAE Cybersecurity Foundational Knowledge Units (KU's)

Knowledge Unit Usage Notional Structure



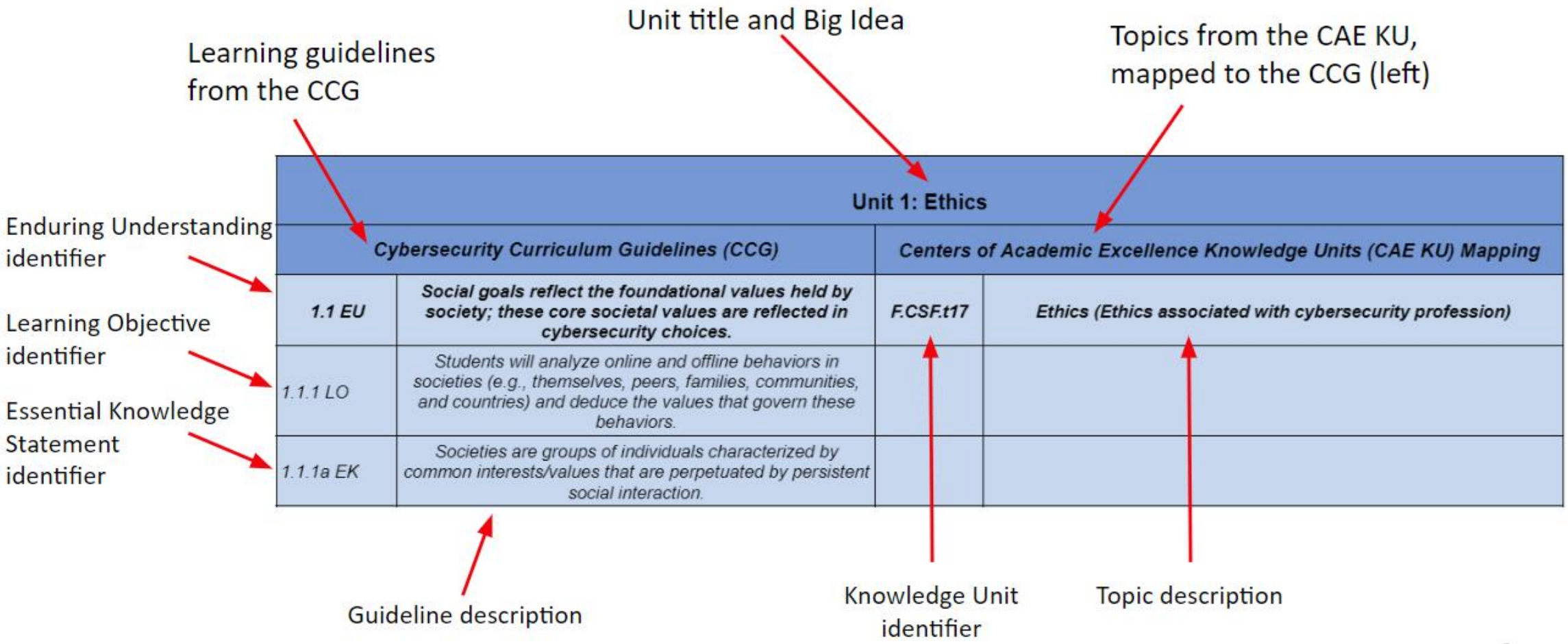
Knowledge Units (KUs):

Foundational: Cybersecurity Foundations, Cybersecurity Principles, and IT Systems Components

Technical Core: Basic Scripting and Programming; Basic Networking; Network Defense; Basic Cryptography; Operating Systems Concepts

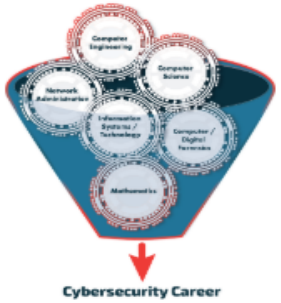
Nontechnical Core: Cyber Threats; Policy, Legal, Ethics, and Compliance; Security Program Management; Security Risk Analysis; Cybersecurity Planning and Management

How Are Standards Mapped to Lessons?



Unit 1: Ethics			
Cybersecurity Curriculum Guidelines (CCG)		***Centers of Academic Excellence Knowledge Units (CAE KU) Mapping***	
1.1 EU	***Social goals reflect the foundational values held by society; these core societal values are reflected in cybersecurity choices.***	***F.CSF.t17***	***Ethics (Ethics associated with cybersecurity profession)***
1.1.1 LO	*Students will analyze online and offline behaviors in societies (e.g., themselves, peers, families, communities, and countries) and deduce the values that govern these behaviors.*		
1.1.1a EK	*Societies are groups of individuals characterized by common interests/values that are perpetuated by persistent social interaction.*		

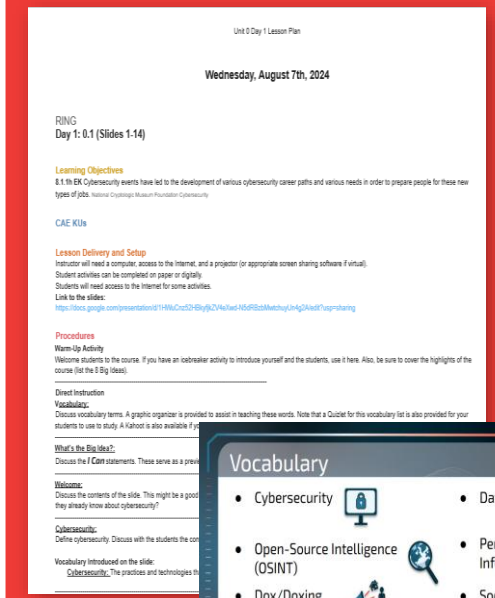
What Content Is in the RING Curriculum?

 Unit 0: Introduction Content List	 Unit 1: Ethics Content List	 Unit 2: Establishing Trust Content List	 Unit 3: Networking Content List	 Unit 4: Data Security Content List
 Unit 5: Introduction to Python Programming Content List	 Unit 6: System Security Content List	 Unit 7: Adversarial Thinking Content List	 Unit 8: Risk Content List	 Unit 9: Implications Content List

RING Canvas Couse Link

What Materials Do the Units Include?

Lesson Plans & Slide Decks


Unit 0 Day 1 Lesson Plan

Wednesday, August 7th, 2024

RING
Day 1: 0.1 (Slides 1-14)

Learning Objectives

CAE KUs

Lesson Delivery and Setup

Procedures

Warm-Up Activity

Direct Instruction

Vocabulary:

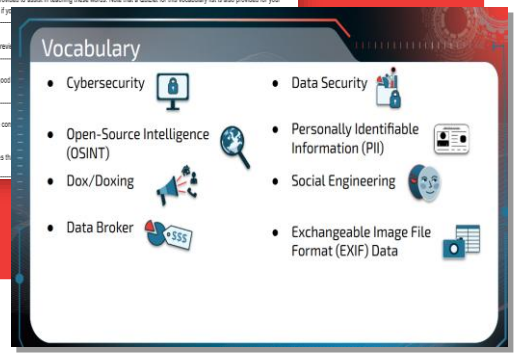
What's the Big Idea?:

Welcome:

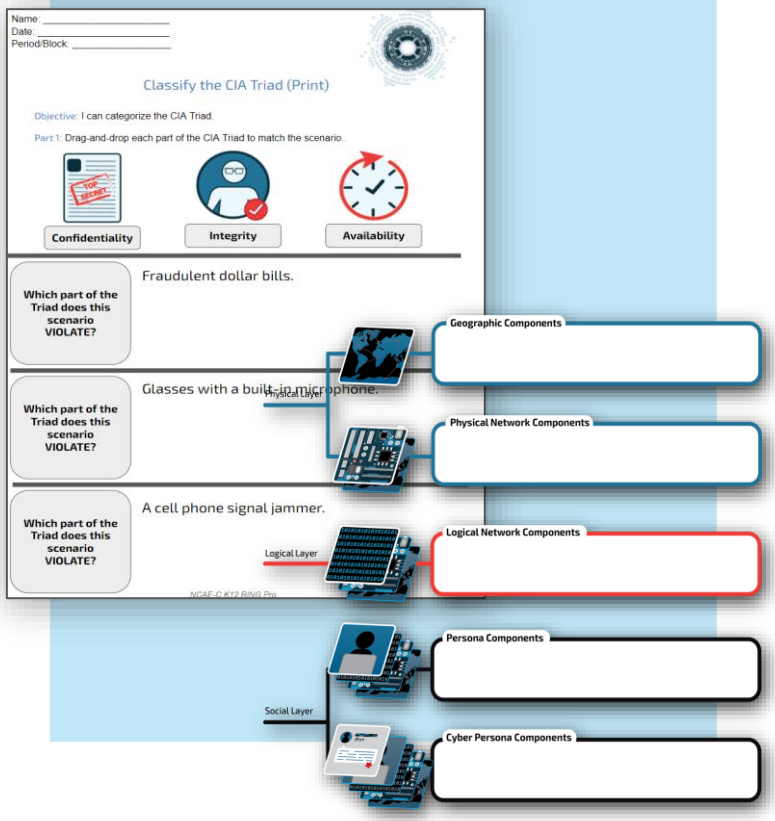
Cybersecurity:

Vocabulary Introduced on the slide:

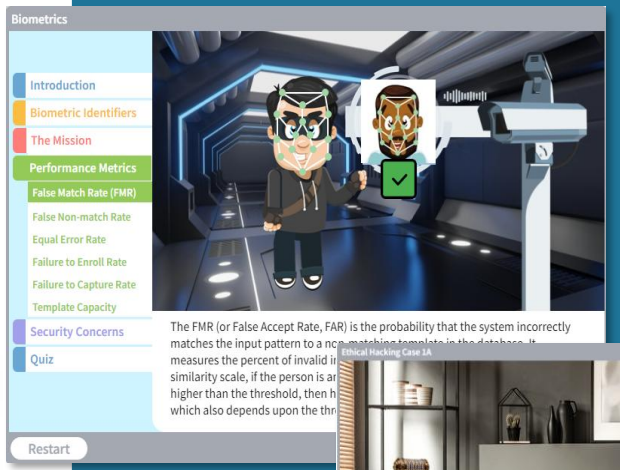
Cybersecurity: The practices and technologies th

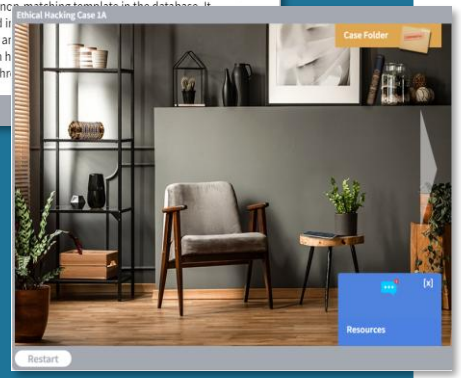


Graphic Organizers & Study Guides



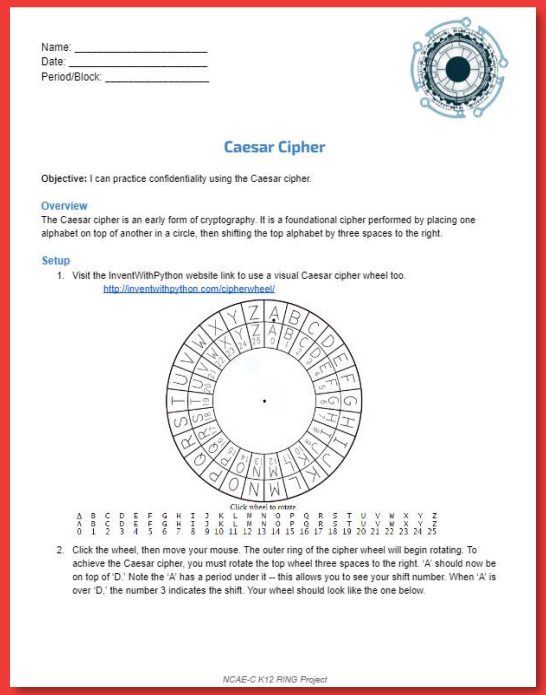
Labs & Games





What Materials Do the Units Include (continued)?

Activities & Projects



Name: _____
Date: _____
Period/Block: _____

Caesar Cipher

Objective: I can practice confidentiality using the Caesar cipher.

Overview

The Caesar cipher is an early form of cryptography. It is a foundational cipher performed by placing one alphabet on top of another in a circle, then shifting the top alphabet by three spaces to the right.

Setup

1. Visit the InventWithPython website link to use a visual Caesar cipher wheel too.
   http://inventwithpython.com/cipherwheel/

Click wheel to rotate

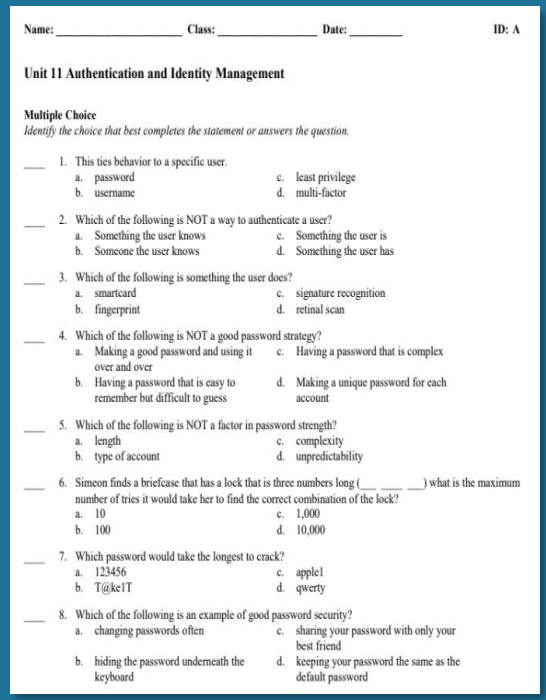
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

2. Click the wheel, then move your mouse. The outer ring of the cipher wheel will begin rotating. To achieve the Caesar cipher, you must rotate the top wheel three spaces to the right. 'A' should now be on top of 'D.' Note the 'A' has a period under it -- this allows you to see your shift number. When 'A' is over 'D,' the number 3 indicates the shift. Your wheel should look like the one below.

NCAE-C K12 RING Project

Visually-Rich Content & Videos

Assessments & Answer Keys



Name: _____ Class: _____ Date: _____ ID: A

Unit 11 Authentication and Identity Management

Multiple Choice
Identify the choice that best completes the statement or answers the question.

___ 1. This ties behavior to a specific user.
a. password c. least privilege
b. username d. multi-factor

___ 2. Which of the following is NOT a way to authenticate a user?
a. Something the user knows c. Something the user is
b. Someone the user knows d. Something the user has

___ 3. Which of the following is something the user does?
a. smartcard c. signature recognition
b. fingerprint d. retinal scan

___ 4. Which of the following is NOT a good password strategy?
a. Making a good password and using it over and over c. Having a password that is complex
b. Having a password that is easy to remember but difficult to guess d. Making a unique password for each account

___ 5. Which of the following is NOT a factor in password strength?
a. length c. complexity
b. type of account d. unpredictability

___ 6. Simeon finds a briefcase that has a lock that is three numbers long (___ ___ ___) what is the maximum number of tries it would take her to find the correct combination of the lock?
a. 10 c. 1,000
b. 100 d. 10,000

___ 7. Which password would take the longest to crack?
a. 123456 c. apple1
b. T@ke1T d. qwerty

___ 8. Which of the following is an example of good password security?
a. changing passwords often c. sharing your password with only your best friend
b. hiding the password underneath the keyboard d. keeping your password the same as the default password

Unit 0 – Introduction – **ACTIVITIES** EXIF Extraction

Name: _____
Date: _____
Period/Block: _____

EXIF Extraction

Objective 1: I can understand that EXIF data is often embedded in pictures.
Objective 2: I can extract and interpret EXIF data.

Overview

When a photo is taken on a camera or smartphone, extra information is often added to the picture that may describe when a photo was taken, where it was taken, and even camera settings such as shutter speed and focal length. This information is known as EXIF (exchangeable image file) data and is useful for photo organization, timestamping, and location mapping, but it can also be a privacy and security concern.

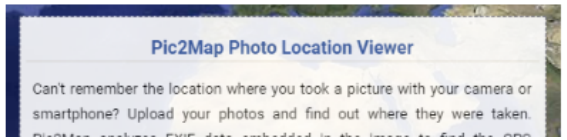
If a photo containing EXIF data is uploaded to a website, anyone who downloads the picture can extract the information.

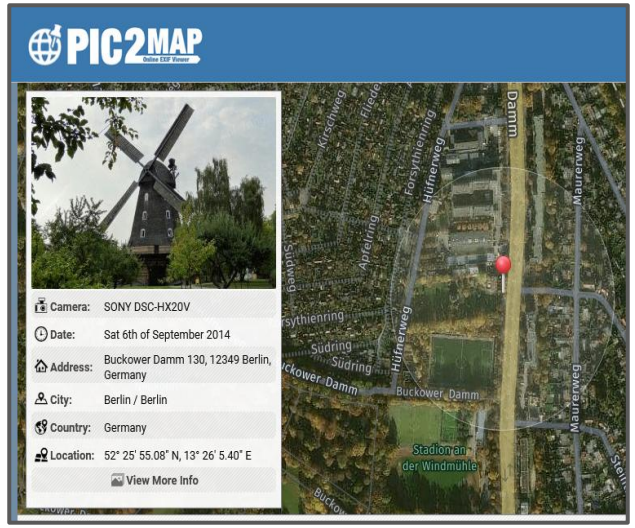
The Tool

The website pic2map.com will check any uploaded photos for EXIF data. Use the site to test the picture linked below to determine the time and location it was taken.

Investigate

1. Download the picture file Food. Be sure to note the location of where the file is downloaded.
2. Open the website pic2map.com. Select **Keep photos private**, as shown below.





EXIF Extraction Activity Link

Food Picture Link

Pic2Map Website Link

Test your knowledge!

Complete the Cyber Hat Match

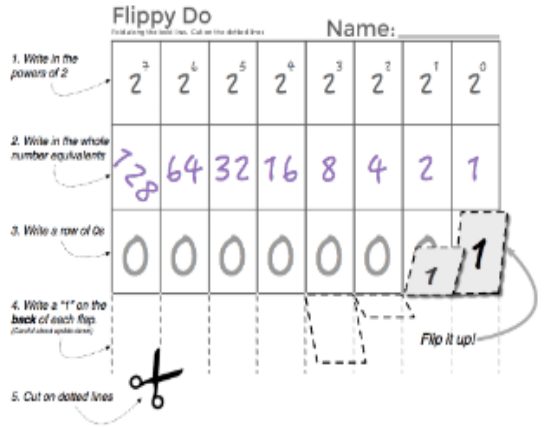
→ **Log into https://myEMATES.org**
→ **Click on Cybersecurity Tab**
→ **Look under Games/Activities**

Unit 3 – Ubiquitous Connectivity - Activity

Great unplugged assignment for your students!

Make the Flippy Do

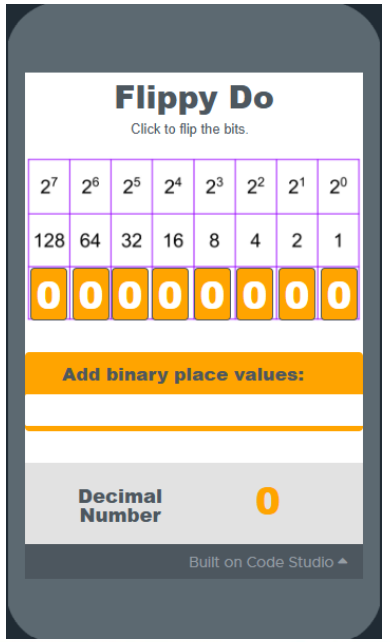
- **Distribute**: **Flippy Do Template - Worksheet** - one per student.
- **Display**: **How to Make a Flippy Do - Teacher Guide** (or just click the diagram image below to enlarge it)



Paper Flippy Do Template Link

Another resource –
Digital Flippy Do

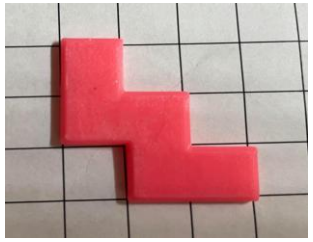
Code.org Electronic Flippy Do Link

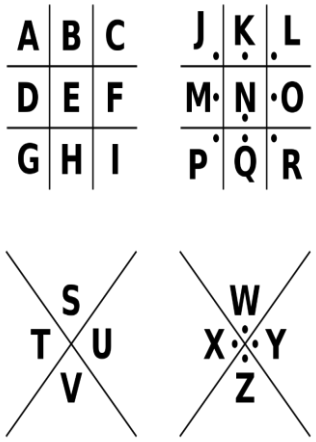


Cryptography Partner Activity

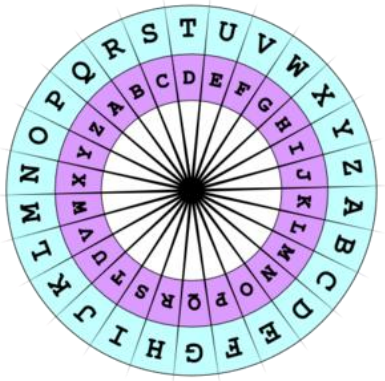
CIA Triad – Confidentiality – Cryptography and Pentominoes!

Use your understanding of cryptography to decipher the following clues. Each cipher contains a coordinate pair; this pair indicates where to place each Pentomino on the coordinate grid. By the end, the Pentominoes will be arranged in the shape of a mysterious animal. Which animal will *your* team discover?





Letter	Code	Binary	Letter	Code	Binary
A	aaaaa	00000	N	abbaa	01100
B	aaaab	00001	O	abbab	01101
C	aaaba	00010	P	abbba	01110
D	aaabb	00011	Q	abbbb	01111
E	aabaa	00100	R	baaaa	10000
F	aabab	00101	S	baaab	10001
G	aabba	00110	T	baaba	10010
H	aabbb	00111	U, V	baabb	10011
I, J	abaaa	01000	W	babaa	10100
K	abaab	01001	X	babab	10101
L	ababa	01010	Y	babba	10110
M	ababb	01011	Z	babbb	10111



THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

CENTER FOR CYBERSECURITY RESEARCH AND EDUCATION

Escape Dr. Sodabas' Office

This is a FUN, CHALLENGING Virtual Escape Room activity. It should take approximately 30 minutes to complete.

Escape Dr. Sodabas's Office Link

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

CENTER FOR CYBERSECURITY RESEARCH AND EDUCATION

Physical Escape Room Activity

NASA Defense In-Depth Escape Room

MISSION: You are beginning an Internship with NASA's Elite Cybersecurity Division. NASA sent you a box full of things and a letter explaining that you must find a passphrase to enter the front gates. Can you solve it?

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

CENTER FOR CYBERSECURITY RESEARCH AND EDUCATION

How Can I Request Access to RING?

Educators may request FREE RING curriculum access at https://www.caeepnc.org/ring and click the button 'Free Curriculum for Educators'

Note: Your Canvas invitation may go to your spam folder. It will come from "Canvas Free for Teachers" with the email address **notifications@instructure.com**. If you do not receive an invitation, please email ring@caecommunity.org.

How Do I Download RING Content?

The Educator will be a STUDENT in a RING course and can access all content. Educators should not use this platform as a teaching platform.

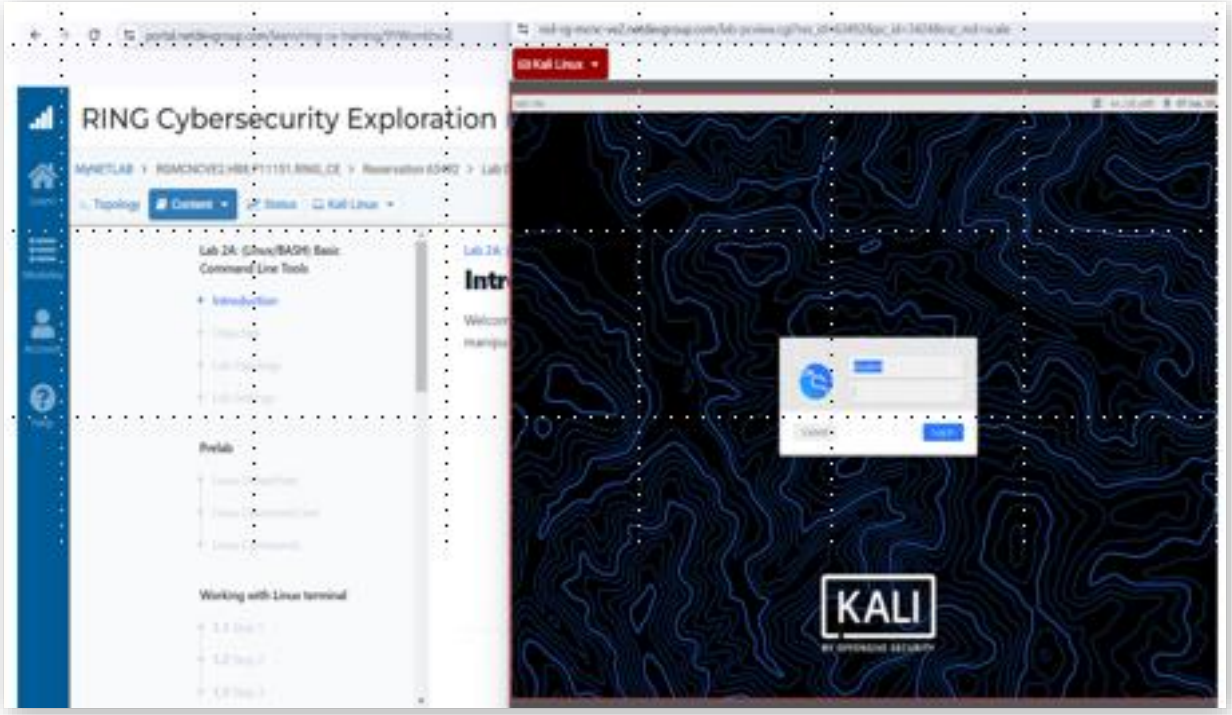
The link to download the full RING Canvas Instructor is found on the RING Canvas home page. Educators will download a “.imscc” file to import into their own Canvas LMS.

Educators can also download individual files from Canvas to their devices and upload them into their LMS.

Do You Have a Virtual Machine with

YES! My NetLab

1. Educators must join the Canvas RING Instructor Course
2. Email the My NetLab Administrator Kyle Jones at kyle.jones4990@sinclair.edu to request access



Do You Need Additional Resources?

Download these awesome materials you can use in your classroom!

- ✓ **Additional Cybersecurity Resources**
- ✓ **Brief and Detailed RING Curriculum Overviews**
- ✓ **My eMATES Overview**
- ✓ **Sample RING Educators Pacing Guide**
- ✓ **Other Cool Stuff**

Additional Resources for Educators

Resources Google Drive Link

https://bit.ly/3W7gl9U

Artificial Intelligence Module – Sneak Peek!

Notice

The AI unit currently under development is in progress and may not reflect the final version of the curriculum. This segment is part of the AI Ethics section of the curriculum, and modifications are anticipated as the content is refined. Therefore, we request you refrain from distributing or sharing this material externally until the final version is released.

Ethics and AI

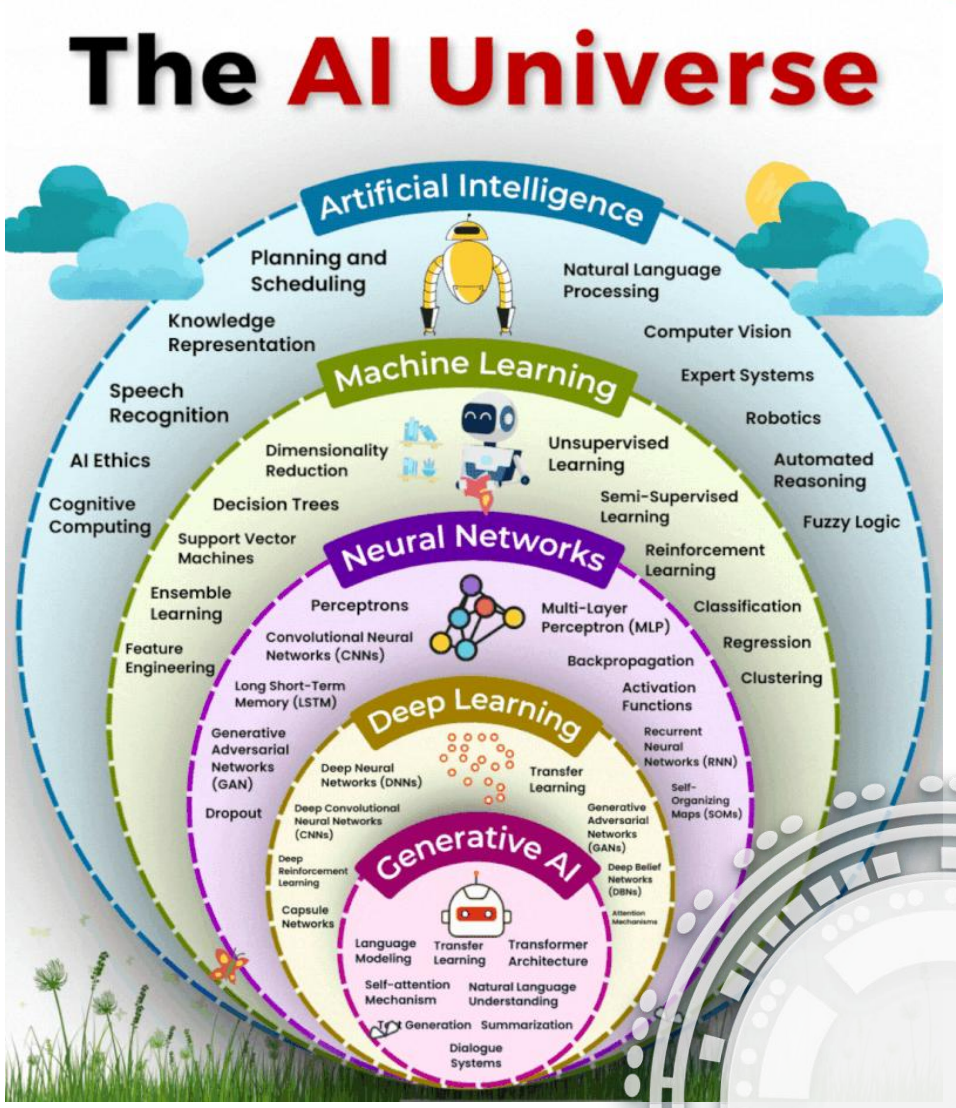
As AI grows in capability and as it becomes readily available to the public for free use, researchers and policymakers are working to ensure this technology is regulated. Many are trying to make sure it is not abused.

Ethical concerns include how moral principles govern the use of AI technologies and how it impacts users and society.

Generative AI

AI was used to understand and analyze data, learning many things and how they look. Just as AI was used to predict things, engineers developed AI to create things based on what it has seen and learned.

This process which generates new data is called **content generation** and is an essential part of **generative AI**.



Generative AI - Images

AI art uses ML techniques to create visual artwork. Models like generative adversarial networks (GANs) and Stable Diffusion can make realistic and impressive art.

AI art brings up questions about originality, who owns the art, and possible misuse. It's important to use AI art thoughtfully and make rules to human artists and keep creative works genuine!

Generated in GPT4o with prompt: 'happy mailman'

Generative AI - Videos

Assisted technologies can create cartoons, animations, or add cool effects to videos. This includes generating from a prompt.

AI can swap faces in videos or change a video's appearance to match a specific style, like making it look like a painting or a cartoon.

AI also can automatically edit videos, fix shaky footage, or improve video quality to make it look better.

Generative AI - Deepfakes

Deepfakes are AI-generated images, videos, or audio that convincingly portrays people saying or doing things that they have not.

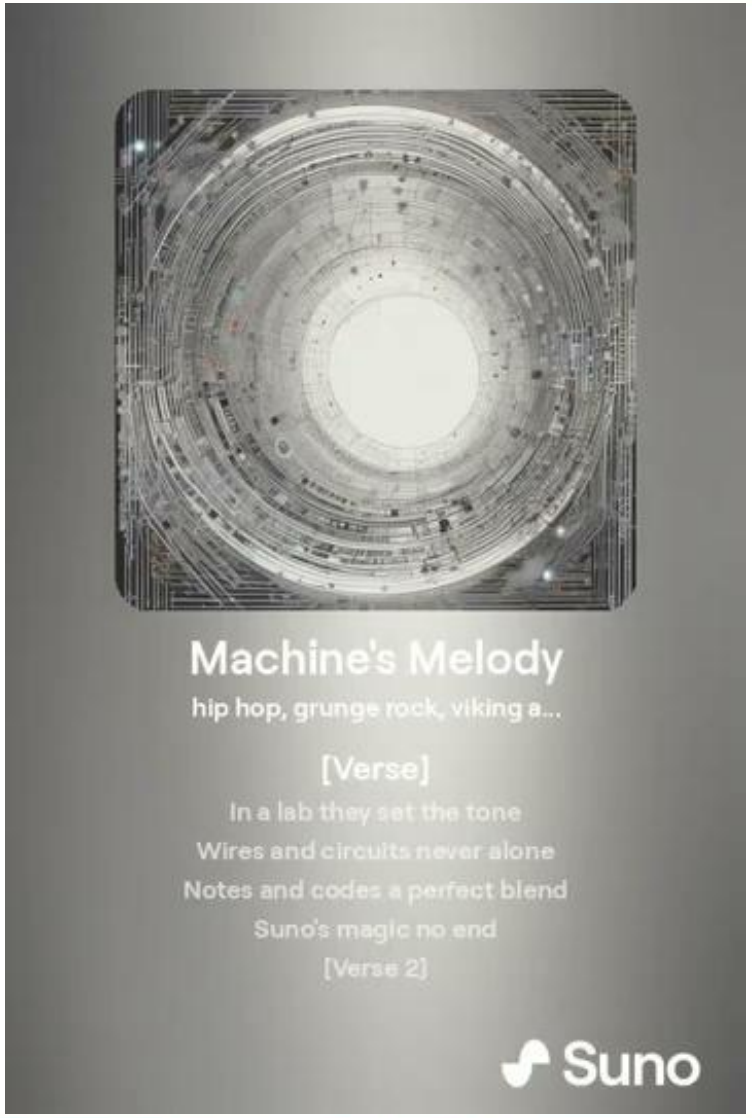
Deepfakes can spread false information or create misreported news. They can also violate privacy by manipulating media without consent.

Generative AI - AI Music

AI-generated music involves using ML and DL to create new renditions of existing songs by synthesizing vocals. They use GANs and transformer models trained on datasets of music and vocal recordings.

By analyzing patterns in recordings, tools can generate new audio that imitates an artist's voice or music style. AI learned that certain genres have certain associations.

Prompts can generate songs like this one:

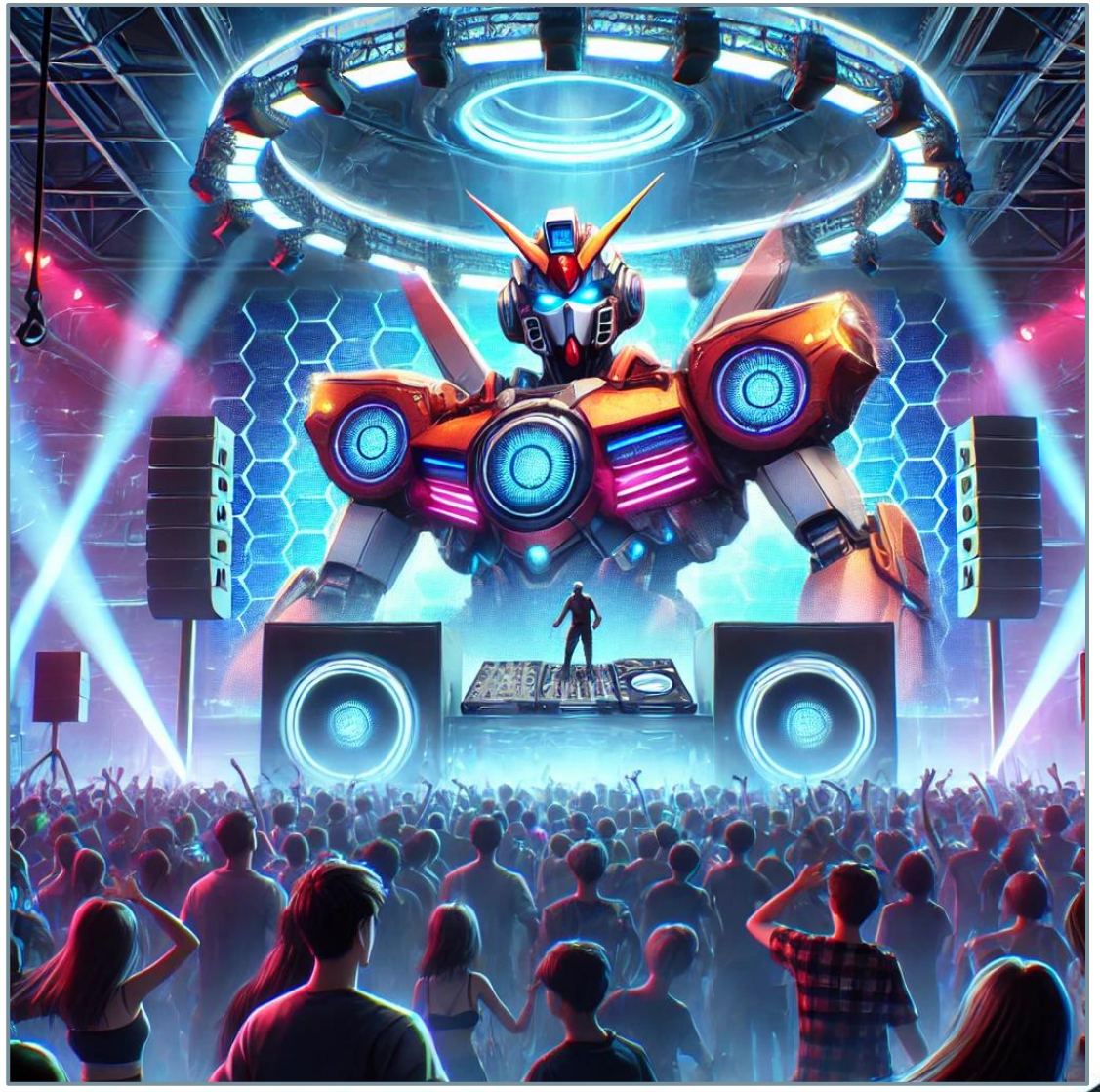


Generative AI - AI Music

While AI enables innovating musical content, it also raises ethical concerns about:

- Copyright
- Authenticity
- Consent from original artists
- Responsible use to respect the rights and intentions of creators

YouTube Video - Phoenix - Alpha Zulu



RING Educators Training Workshops

Over 20 free training workshops were given at CAE institutions in 2024; many are already scheduled for 2025!

Please contact
Jennifer.Marden@UAH.edu
to discuss training opportunities.

Are you ready to use RING?

Thank you for attending!
Please complete this survey.

https://bit.ly/RING_Survey