

Cyber Security Fundamentals

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Microsoft's AI.



AAA



AUTHENTICATION



AUTHORIZATION



ACCOUNTING



Hacker Motivation

What motivates people to circumvent security?

Hacker Motivation

What motivates people to circumvent security?

1. Financial Gain
2. Hacktivism
3. Revenge
4. Curiosity, Challenge
5. Espionage
6. Thrill-Seeking
7. Profitable Criminal Enterprise
8. Social Recognition

From:

<https://brandefense.io/blog/drps/cyberattacks-what-motivates-hackers/>

Hacker Hats

<https://sectigostore.com/blog/different-types-of-hackers-hats-explained/>



Black Hat Hackers: Bad hackers who use cyber attacks to gain money or to achieve another agenda.

These hackers penetrate systems without permission to exploit known or zero-day vulnerabilities.



White Hat Hackers: Ethical hackers who protect your systems from black hat hackers.

Penetrate the system with the owner's permission to find and fix security vulnerabilities and mitigate cyberattacks.



Grey Hat Hackers: Hackers who cruise the line between being good and bad. Penetrate systems without permission but typically don't cause harm.

Draw attention to vulnerabilities and often offer a solution to patch them by charging fees.

Hacker Hats

<https://sectigostore.com/blog/different-types-of-hackers-hats-explained/>



Red Hat Hackers: Hackers who use cyber attacks to attack black hat hackers.

Their intentions are noble, but these hackers often take unethical or illegal routes to take down bad hackers.



Blue Hat Hackers: Hackers who seek to take personal revenge, or outside security professionals that companies hire to test new software & other products to find vulnerabilities prior to release.



Green Hat Hackers: Newbie hackers who are learning to hack.

They're often not aware of the consequences of their actions & cause unintentional damage without knowing how to fix it.

AI for Slide Design

Are the formats
distracting?

Positives and
Negatives?

Five Principles to Follow and One to Avoid

Defense in Depth

Least Privilege

Separation of Duties

Security by Design

KISS

Security by Obscurity

Symmetric Key Cryptography

Alice is talking to Bob secretly.

Both Alice and Bob know an algorithm for encrypting

Both Alice and Bob know secret information (key) to decipher the code

Caesar Cipher C(4)

	0	1	2	3	4	5	6	7	8	9	10	11	12
Plain	A	B	C	D	E	F	G	H	I	J	K	L	M
Cipher	E	F	G	H	I	J	K	L	M	N	O	P	Q

	13	14	15	16	17	18	19	20	21	22	23	24	25
Plain	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Cipher	R	S	T	U	V	W	X	Y	Z	A	B	C	D

Example: https://www.simonsingh.net/The_Black_Chamber/caesar.html

Substitution Cipher

	0	1	2	3	4	5	6	7	8	9	10	11	12
Plain	A	B	C	D	E	F	G	H	I	J	K	L	M
Cipher	Z	N	L	X	M	K	Q	J	Y	T	O	P	I

	13	14	15	16	17	18	19	20	21	22	23	24	25
Plain	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Cipher	V	F	S	R	A	H	D	U	E	G	C	B	W

Substitution Cipher (key)

	0	1	2	3	4	5	6	7	8	9	10	11	12
Plain	A	B	C	D	E	F	G	H	I	J	K	L	M
Cipher	H	O	L	I	D	A	Y	B	C	E	F	G	J

	13	14	15	16	17	18	19	20	21	22	23	24	25
Plain	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Cipher	K	M	N	P	Q	R	S	T	U	V	W	X	Z

The Vigenere Table

Plain	keyword																									
	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
	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	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
1	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
2	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
3	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
4	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
5	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
6	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
7	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
8	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
9	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
10	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
11	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
12	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
13	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
14	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
15	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
16	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
17	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
18	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
19	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
20	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
21	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
22	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
23	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
24	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
25	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

cipher

Cracking the Code with Frequencies

Cracking Tool:

https://www.simonsingh.net/The_Black_Chamber/vigenere_cracking_tool.html

Letter Frequencies:

https://www.simonsingh.net/The_Black_Chamber/letterfrequencies.html