

In the Covid Era – Teaching Cybersecurity Across Disciplines



UNIVERSITY of HAWAII®
MAUI COLLEGE



Debasis Bhattacharya (debasisb@hawaii.edu)
Supported by NSF Award # 1700562
November 2020

Agenda

- Background
- Cybersecurity Education
 - Traditional
 - Across Disciplines
 - During Covid-19!
- Demo Activity
 - Lock Picking!
- Lessons Learned
- Q&A



Background - College

- University of Hawaii Maui College
 - Serves Maui County - islands of Maui, Molokai and Lanai
 - 150,000 or so resident population
 - 2 Million or so tourists per year (pre-Covid)
 - Dropped 95% after March 2020!
 - 2000+ full-time commuter students
 - 20 or so Associate Degrees
 - 3 Baccalaureate Degrees
 - 60% or so women students
 - Average of students ~25 years
 - Non-traditional students
 - Commuter island college



Cybersecurity Education - Traditional

- Certificates in Cybersecurity
 - Low Level - Intro, Network+, Security+
 - Higher Level - Ethical Hacking, Forensics
- Internships
 - Government, banks, utilities
- Baccalaureate Degree
 - Applied Business and Info Tech
 - Cybersecurity courses are embedded
- Cyber competitions and Workshops
 - NSA GenCyber, US AFA CyberPatriot
- Supported by NSF Grants
 - ATE Program Award# 1700562



Cybersecurity Education - Across Disciplines & Segments

- Cybersecurity education cuts across various segments
 - Community College program disciplines
 - Gender
 - Minorities
 - Background - high schools, professionals, returning veterans etc
 - Various Industries
 - Accounting, Hospitality, Law Enforcement, Utility, Tourism etc.
- One size education does not fit all types of students!



Cybersecurity Education - Across Disciplines

- Focus on 5 disciplines at Associate Degree level
 - Accounting
 - Administration of Justice
 - Electronics
 - Hospitality, Travel and Culinary
 - Business
- Supported by NSF
 - ATE Grant, Award# 1700562
 - SFS Capacity Building Grant, Award# 1437514



Cybersecurity Education - Across Student Population

- Focus on students from a variety of backgrounds
 - Women
 - Minorities
 - Veterans
 - Working Professionals
 - High School Students
 - Remote students who rely totally on distance education
 - Economically disadvantaged
 - Low math/science proficiency
 - Non-technical
 - Non-traditional
 - Not interested in Cybersecurity as a career!



Cybersecurity Education – During Covid-19!

- Online education via Zoom!
 - Students were engaged as they felt safe
 - Higher attendance in classes
- Lab sessions
 - Difficult without a physical space and equipment
 - Students need to rely on their Internet connectivity
 - Cloud assignments required students to log in from their homes
- Hands-on activities
 - Lock Picking
 - Raspberry Pi
 - Pen Testing Tools from www.Hak5.org
 - USB Rubber Ducky – writing Ducky Scripts
 - Bash Bunny - Pen testing tool to emulate various devices
 - LAN Turtle – Provides stealth remote shell access

LOCKPICKING



DISCLAIMER

GROUND RULES PER THE OPEN ORGANIZATION OF LOCKPICKERS (TOOOL)

“

1. *Only pick, or attempt to pick, that which you own.*
2. *Do not pick any lock that you may rely on (ex: lock to your house or car)*
3. *The possession of lockpicking sets is generally legal throughout the United States but exceptions do exist. Local municipalities may differ so check with your local code office.*

TOOOL provides a brief overview of the possession and ownership of lockpicks by state at their website, <https://toool.us/laws.html>

”

SUPPLIES



Next Steps

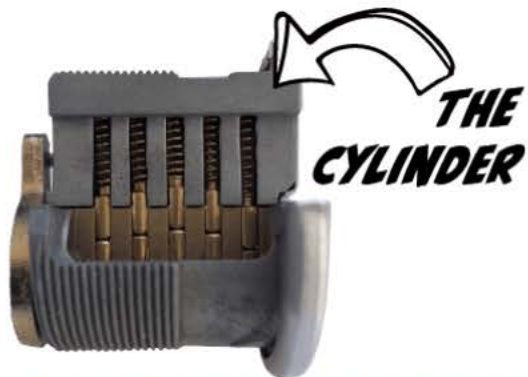
- Lock components
- Lock operation
- Reading lockpicking instructions
- Watching YouTube videos from experienced lockpickers

The screenshot shows an Amazon search results page for "lockpick sets". The search bar at the top contains the text "lockpick sets". Below the search bar, there are navigation links for "Coupons", "Best Sellers", "Whole Foods", "Leslie's Amazon.com", "Prime Video", "Customer Service", and "Prime Day is Oct". The results section shows 48 of 215 results for "lockpick sets". The first three results are:

- Professional 24 PCS Set Training Kit with Lock - Blue**: \$25.99. Get it as soon as Tue, Oct 6. FREE Shipping by Amazon. Only 1 left in stock - order soon.
- Professional 17-PCS Set Training Kit 2 Locks(BLUE)**: \$25.99. FREE Shipping by Amazon. In stock on October 7, 2020.
- Stainless Steel Multi-Function Tools, Pick Repair Tool Set**: \$24.74 (14% off from \$28.74). Save 40% with coupon. Get it as soon as Mon, Oct 5. FREE Shipping on orders over \$ shipped by Amazon.

OPERATION

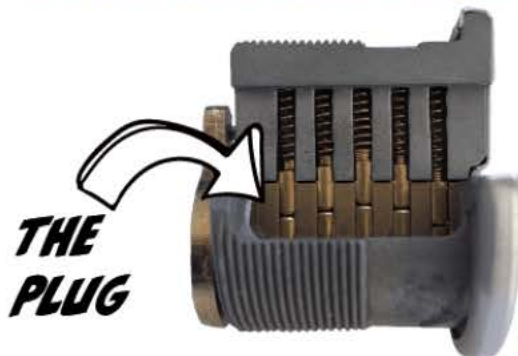
6 primary components
that we effect while lockpicking



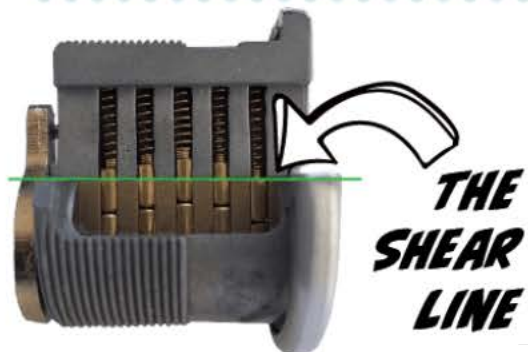
The cyclinder, part of the lock houses the rest of the components, aka shell, housing, or body of the lock. It is what slides into a door or padlock, creating the upper limit of shear line. Consider this as the "top paper."

TOP PAPER

BOTTOM PAPER



The plug surrounds the keyway, rotates freely within the housing, creating a rotational shear line. Consider this as the "bottom paper."



The shear line is where the plug and and hull casing meet. The goal of lockpicking is to manipulate the pins so that driver prins are above the shear line and key pins are still within the plug, allowing rotation and unlocking.

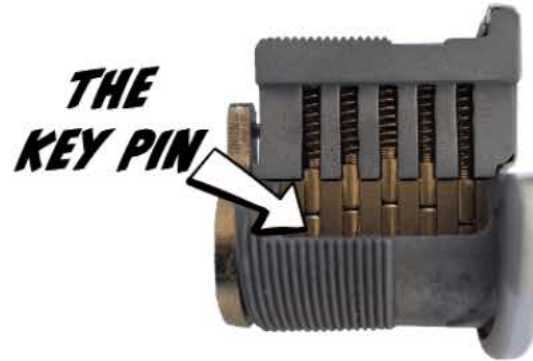
**SHEAR
LINE**

TOP PAPER

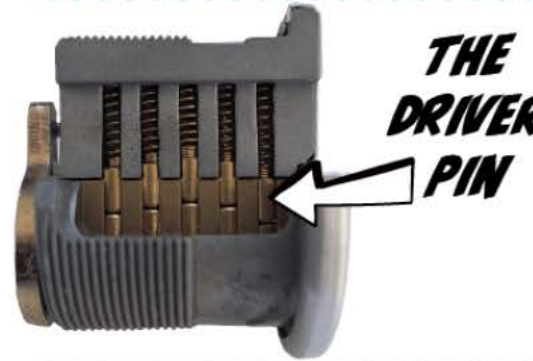
BOTTOM PAPER

OPERATION

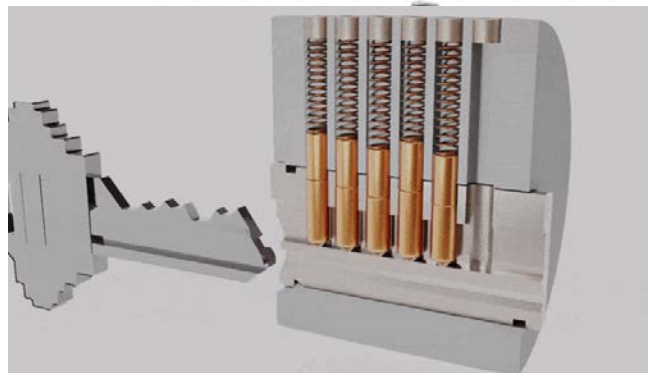
6 primary components
that we effect while lockpicking



The opening of the lock that the key may be inserted into is called the keyway, where you are able to see key pins. The lower pins makes contact with the key upon insertion.

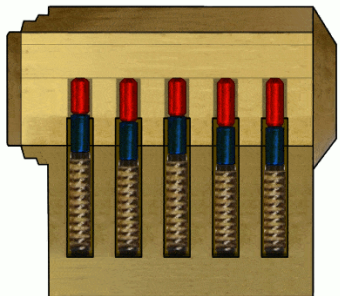
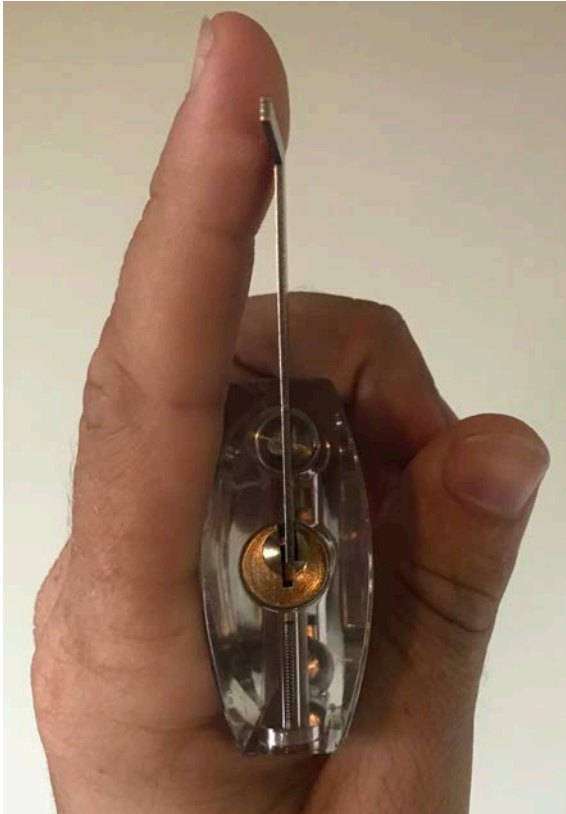


The top pins are called the driver pins because it is driven down by the springs, responsible for obstructing shear line and providing the locking action. Unlike the key pins, the driver pins are usually same length. Consider this as the "pencil."



The springs have two jobs: forcing everything down into the plug and push the key pins against the key, which helps read the cuts of the key. Without springs, the pins could get stuck anywhere in the pin chamber.

INSTRUCTIONS



1. Begin by holding the lock in a comfortable manner in your left hand with the torque wrench inserted.



2. Wrap your left thumb around the bottom of the lock to provide support and your left index finger straight up to provide tension to the torque wrench.



3. Holding your pick as you would a dart, grasping it with your index finger and thumb, insert it into the lock all the way to the back.



4. As you get near the back of the lock, begin applying tension with your left index finger on the torque wrench.



5. When the pick is at the back begin to draw the pick out, pushing down gently against the key pins as you continue to provide even pressure on the torque wrench.



6. The process of pushing and pulling the pick against the pins is called raking. If the lock does not open within three to four rakes, release tension on the torque wrench and try again as it is possible that a pin has been pushed too far and is binding.

Online Cybersecurity Education – Lessons Learned!

- Online education via Zoom!
 - Students feel safe
 - Students learn the theory
 - Students have to provide their own Internet connectivity and laptops
- Lab sessions
 - Cloud labs work, assuming they are free and no credit cards needed
 - Lab modules need to be transferred to a cloud environment
 - Students have to know about the cloud environment
- Hands-on activities – key to engagement!
 - Lockpicking
 - Raspberry Pi
 - Pen Testing Tools from www.Hak5.org
- Students learn to adapt and survive...



Questions? Comments? Feedback?!

Debasis Bhattacharya, JD, DBA
debasisb@hawaii.edu
maui.hawaii.edu/cybersecurity



UNIVERSITY of HAWAII®
MAUI COLLEGE

REFERENCES

- How To Pick A Lock [Digital images]. (n.d.). Retrieved from <https://www.art-of-lockpicking.com/how-to-pick-a-lock-guide/>