Teaching Malware Analysis in Challenging Times

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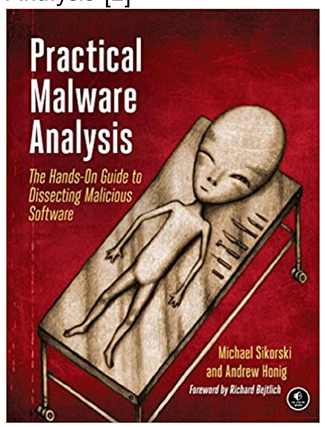
Introduction and Objectives

We summarize our experience in teaching malware analysis, especially in the last two years.

- At MTEM 2013 we presented "Lessons Learned Teaching Malware Analysis" [1]
- After seven years and a pandemic, we have more to share...

Some Things Have Not Changed

- Demand for malware analysts remains strong in the Baltimore-Washington area
- We have stayed with Practical Malware Analysis [2]



- The basic course outline has stayed the same.
- The course remains popular, about fifty students per offering, which is large for an elective course in our program.

Acknowledgements

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Course Topics

- Installing and Using VMs
- Utilities for static analysis
- Basic Windows internals and API
- Network tools, e.g. Wireshark
- Disassemblers: IDA and Ghidra
- Debuggers: Immunity (not Olly)
- Varieties of Malware
- Dealing with packed and obfuscated code

What Have We Changed?

- We used to teach the course in a lecture hall, but we now teach it online, and that's *better*
- We must record our sessions, for the sake of students who participate outside of class hours, but that's quite handy!
- We have no lecture halls that have enough seating, AV capability, and AC power. But with all students being remote, no problem!
- Solutions to exercises are in the back of PMA, which limits the use of those problems
- We no longer require a programming project as such, which was perhaps the only opportunity for students to experience Windows systems programming...

What Would We Change If We Could?

- Still not much time in the course for Android malware, or web-based, or Linux...
- Students often lack sufficient expertise in assembler language, which is annoying

What do students like the most?

- Disclaimer: we have only anecdotal evidence to support these comments
- Guest speakers! Some from local intelligence agencies, more recently from industry, especially FireEye
- Students appreciate having access to recordings of demos, especially tools like Ghidra and Immunity with somewhat complex user interfaces
- Students say that they learn a lot from homeworks!

Some Outcomes

- Three former students in this class have earned Ph.D. degrees! others in the pipeline, and many M.S. thesis students
- Those who finish the course sometimes continue as members of our Malware Research Group
- Many former students hold jobs where these skills are of value
- The course web site is available: `https://bit.ly/3vZYKjH`

References

Charles Nicholas and Andrew Coates.
Lessons learned teaching malware analysis.
In *Malware Technical Exchange Meeting (poster session)*, 2013.

Michael Sikorski and Andrew Honig.
Practical Malware Analysis.
no starch press, 2012.