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Theory of Computation Essay

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<div align="center">Impact of Cyber Security Attacks</div>

With the increase in use of technologies ranging from smartphones to multimillion dollar cloud storage, the effects of cyber security attacks on consumers, corporations, and the government are both unending and relentless. Almost everyone has experienced some form of invasion of privacy, theft of information, or financial loss from the safety of their devices. Nothing is secure and thus everything is open for season when it comes to the underground market of hackers and malware developers. In order to deal with these issues, they must be understood at the level of the individual and also the larger groups, businesses and other organizations, profit or non-profit. In the quest for security and privacy, the fight is unending and there must be an effort to organize what is currently known and being done about it.

Perhaps the biggest victim of cyber attacks is the economy, with data breaches happening to even the giants of commercial enterprise such as Sony, Target, and Adobe Systems to name a few. Companies lose both revenue and integrity with its consumer base as a result of these cyber breaches. While the cumulative loss is hard to measure, being that is so widespread and the effects cannot fully be quantified, one report from McAfee and the Center for Strategic and International Studies (CSIS) states that the global economy loses a whopping $600 billion a year on cybercrime (Palmer). The numbers proposed by McAfee and CSIS can absolutely not be

ignored. Economies all over the world are suffering heavily from hackers and it is an understatement to say that this needs to be addressed.

In spite of these losses, there has been positive effects caused by the increase of cyber crime and attacks which sounds absurd but true. There has been more interest and investment in the cybersecurity market as a result and that means even more jobs for those with the skillset to satisfy them. These positions include researchers, investigators, pentesters, and security engineers who can engineer new security suites and schemes to deal with the problems at hand. According to Forbes, the cybersecurity market reached $75 billion in 2015, and it is estimated to grow at a rate of 9.8 percent annually from 2015 to 2020 (The Impact of Cyber Attacks Around the Globe). With the influx of positions for cybersecurity, the rise of education for this discipline will follow. Many institutions of learning are already adopting programs to teach skills in network security, application security, and cryptography which itself has many branches of subjects connected to it.

Additionally, one topic that is too often overlooked is that of the effects that cybersecurity has on individuals, the average American or world citizen. There is a wide range of attacks on the individual which includes hacked emails, social accounts, webcams, and mobile phones (*Forbes*). Online accounts are compromised constantly rather it be email, social media, gaming, or bank accounts. Consumers are now more leary of posting or giving out information willingly and for good reason. Worse than this, children are often targeted by hackers due to their naivety and innocence. They will typically try to manipulate them to share their or their parents private information or financial information. Thus, there is more effort currently be made to educate the youth about dealing with onlines threats of all types. Corporations are also making an

effort to teach their employees about cyber attacks such as social engineering and other which directly exploit the system at a human level. This type of espionage has been around for quite a while and is likely not going anywhere anytime soon. It takes little to no experience in computing to even carry out an attack on the individual. Fake website logins, malicious payloads, and even malware packed QR codes are trivial to generate and deliver to the unsuspecting victims. Again, awareness of these exploits will be a subsequent effect as with the other campaigns of attacks.

Overall, the security of everyday processes and the privacy of data should be in the interest of all organizations and individuals. These attacks grow worse each day with the advancement of offensive techniques such as advanced persistent threats (ADT) and industrial malware such as Stuxnet which could have heavy consequences for the economy. Nothing is safe, not even the most integral of societal systems. In the latest American election for instance, there was evidence that Russian hackers tampered with the votes and voting process, which hurt the integrity of the democratic system in America. Fortunately, there has been much progress in elevating the complexity and effectiveness of security systems, countermeasures, and practices. One such defense against hackers is called the CAPTCHA which was inspired by a creation of Alan Turing, the Turing Test, which verifies humanity with distorted text that must be accurately re-typed into a box (*TeleSign*).

Research in both cryptography and network defense also push the envelope as far as security measures go. Advancements made by government organizations like the National Security Agency (NSA) usually find their way in the consumer market somehow or another as well. The outlook is not a bleak one but an exciting one as society finds new roles for security

enthusiast and new protections that will keep them safeguarded against cyber threats of every

kind. Of course, the average citizen must also be diligent in keeping themselves educated and

also updating their devices to implement the latest patches against software exploits and the like.

Hopefully, after all is said and done, there will be a decrease in the global loss of revenue and an

increase in the integrity of new technologies.

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