**CS591 F2009 Final**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**You have 2 hours and 30 minutes until 7pm to turn in your exam.   
This is open book, open note, with internet access to online material.   
But you cannot chat with others or send requests to a person for help.  
Print a copy for me and also email me a copy your answers**.   
  
To save your time, You can copy and past answers from the homework solutions, power point presentations, search engine results, and online material.

1. Firewall
   1. MASQUERADE.
      1. How MASQUERADE is used?   
         Ans:
      2. Give an example of iptables command for setting up MASQUERADE.   
         Ans:
      3. When an intranet’s http response return, what action will be performed on the packet based MASQUERADE function?   
         Ans:
   2. DNAT.
      1. How DNAT is used?  
         Ans:
      2. Is it applied in PREROUTING or POSTROUTING?   
         Ans:
   3. A web site uses cgi-scripts on a DMZ web server to save the purchasing/credit card information filled by the customer. The purchasing/credit card information is then transferred back to the intranet database server for processing. Unfortunately *(or we should say inconveniently for the designer)* the security policy of the inner firewall prohibits the DMZ web server from initiating a connection to the intranet. We need to let intranet database server periodically pull the credit card files in. Here we assume the hacker can only read the directory for the purchasing/credit card info but not changing the cgi-script
      1. One security engineer proposes to use AES to encrypt the credit card info as a file before the data is transferred back by the intranet database server for processing. What is wrong with the design?  
         Ans:
      2. Someone suggest other encryption scheme will work. Please name the scheme and describe how and why it will work even when the hacker is scanning constantly.  
         Ans:
      3. Assume now the hacker can read the main memory content. Will the above scheme still work? How do you prevent the plain credit card info in the memory from being snatched?  
         Ans:
      4. Assume now the hacker can overwrite files including the scripts. Will the above scheme work? How do you detect that if you cannot prevent that? Name a system that help you detect that.  
         Ans:
2. IDS
   1. How can zero-day worm be detected? Briefly discuss one technique.   
      Ans:
   2. If a hacker changes the content of the TFN DDoS attack msg from "1234" to "blast", what will be the new snort rule to be added?   
      Ans:
   3. The above scenario indicates the problem with IDS detection based on specific patterns.
      1. If the attacker changes the content again, the existing rules will produce false \_\_\_\_\_\_\_. (Fill in the blank).
      2. One security engineering suggests change the attribute “Content:blast” to “Content: \*” a wildcard pattern that match. This new snort rule will produce way to many false \_\_\_\_\_. (Fill in the blank).
      3. What is your solution to this? Hint. We discuss a paper using this approach for detecting zero day worm.  
         Ans:
   4. What are the rule optons in SNORT that can improve the efficiency of the intrusion detection process? List two. Briefly discuss why.   
      Ans:
   5. Explain how the honeypot can be used to reduce the false positives.   
      Ans:
   6. New iptables feature allows the match of a string and thus can be used to implement snort IDS rule.  
      For example,   
      alert tcp $EXTERNAL\_NET any -> $HTTP\_SERVERS $HTTP\_PORTS (msg: “WEB-ATTACKS nmap command attempt”; flow:to\_server, established; content:”nmap%20”; nocase; classtype:web-application-attack; sid:1361; rev:5;)  
      can be implemented as  
      $IPTABLES –A FWSNORT –p tcp - - dport 80 –m string –string “nmap%20” –algo bm –m comment – comment “WEB-ATTACKS nmap command attempt; classtype:web-application-attack; sid:1361; rev:5; FWS:1.0;” –j LOG –log-ip-options –log-tcp-options –log-prefix “[20] SID1361 ESTAB “
      1. What is the advantage on implementing IDS rule as an iptables command?
      2. What will be the iptables command for the following SNORT Rule:  
           
         Alert tcp any any -> 192.168.1.0/24 143 (content: “|90CB C0FF FFFF|/bin/sh”; msg: “IMAP buffer overflow!”)

3. Answer three out of the following nine questions related to the semester projects.

1. Can SELinux be used to implement the mandatory access control? Briefly elaborate that.
2. Can SELinux be used to enforce the “no read up; no write down” policy? Briefly elaborate that.
3. What is SLIDE used for?
4. What is CDS?
5. What are additional features provided by WebScarab Intercept Proxy, compared the one used by Mike Gerschefske? Just name two.
6. Give one example of SQL injection problem and one of their solutions.
7. Briefly explain how software computing is used in behavior based IDS.
8. AMI/AMR security:
   1. A. what are buffer overflow type of vulnerabilities cited on AMR/AMI devices? Name two.
   2. What encryption method is used in MBUS3? What not using AES-256?
9. Brief explain how WCF support of the creation and management of PKI.