

College of Engineering, Pune

End Semester Exam – May 2012

F.Y. M.Tech. (Computer Engineering)

(CT-512)- (Linux Kernel Programming)

Day & Date- Friday, 11th May 2012

Maximum Marks: 50

Time: - 9 am to 12 noon

Duration – 3 hrs

Instructions:

1. All questions are compulsory. Numbers in the right-most column indicate marks.
2. Write indented and commented code.
3. Make suitable assumptions if required, and state them in your answer.
4. All diagrams must be neat and clean. You may use pencil for drawing diagrams.

| Q No. | | Marks |
|-------|---|-------|
| 1 | Write a kernel character device driver which creates three device files. Each file acts as a dummy device, represented using in memory data structures. Each device file allows at most five instances of writing of chunks until they are read. Each write allows writing any length of data. The device remembers each chunk of data that was written. Each read returns data from the chunks in FIFO order. If the size of read is less, remaining part of the chunk is discarded, if the size of read is more than the size of current chunk then only the existing chunk sized bytes are returned. Write the required shell commands also. | 10 |
| 2 | Write an implementation of a counting semaphore using spinlocks. | 5 |
| 3 | Draw a diagram of following Linux kernel data structures w.r.t. task_struct of a process: fd_array, struct file, struct inode, struct ext2_inode, struct dentry, struct address_space. Show all possible linkages among the structures. | 5 |
| 4 | Write a conformance test for checking whether reading more data than the size of a file fails properly or not. Write required C and shell code. | 5 |
| 5 | Write a C program which takes an inode number and a ext2 device file name as arguments, and prints the group descriptor of the group which contains the inode. (Assume suitable variable names for various structures like superblock, group descriptor, inode, etc.) | 10 |
| 6 | What is the need for the copy_from_user and copy_to_user functions? Is it possible that memcpy works some times and why? | 5 |
| 7 | Explain the read copy update mechanism with suitable code example. | 5 |
| 8 | Explain the process of adding a system call; and how it gets called by user level functions. What is the significance of the syscall_table_32.S file used for adding new system calls? Explain the issues related to linking as well. | 5 |

COLLEGE OF ENGINEERING PUNE
(An Autonomous Institute of Govt. of Maharashtra)

END -SEM EXAM
Network Security

Program: **F.Y. M.Tech. (Computer Engineering)**

Year: 2011-12

Semester: **Spring**

Date: 08-05-12

Duration: 3 hrs.

Max. Marks: 50.

Instructions:

1. All Questions are Compulsory.
2. Make appropriate assumptions wherever necessary.
3. Give examples and draw neat diagrams wherever necessary.

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- Q1. A. What is IDS? How it works? Describe its types and distinguish between IDS and Firewall (05)
- B. Explain the various applications of RFID. Describe the working of RFID by taking a real life example. (05)
- Q2. A. Describe the following threats with example: (06)
- a) Sniffing
 - b) Modification or Alteration
 - c) Masquerading
 - d) Repudiation of origin
 - e) Denial of receipt
 - f) Denial of Service
- B. List the various attacks possible on DES? Explain the Linear Cryptanalysis and Differential Cryptanalysis attack with respect to DES in detail. (04)
- Q3. A. Assume an RSA signature scheme is used with $p = 31$, $q = 19$, and $Y_B = 17$ is Bob's public key and $Y_A = 11$ is Alice's public key. Alice receives the message $(c, sig(m)) = (281, 504)$, where c is cipher text for plaintext m
- a) Is the signature valid?
 - b) How many valid signatures are there for each message m using the parameters chosen for this signature scheme?
- B. Users A and B use the Diffie-Hellman Key exchange technique a common prime $q=71$ and a positive root $\alpha=7$.
- i. If user A has private key $X_A = 5$, what is A's public key Y_A ?
 - ii. If user B has private key $X_B = 12$, what is B's public key Y_B ?
 - iii. What is the shared secret key?
- C. Solve the following: (02)
- i) $2x + 7 \equiv 3$
 - ii) $7d \equiv 1 \pmod{30}$

- Q. 4. A What do you mean by Authentication? Describe various requirements and working of Kerberos. (05)
- B Describe the various wireless technologies used for transferring information. Explain the security issues involved in it. (05)

OR

- B What protocols comprise SSL? Describe the services provided by each protocol? (05)
- Q. 5. A Explain various services provided by IPSec. Distinguish between Transport and tunnel mode of IPSec. (05)
- B List various ways of distribution of public keys. Explain each by taking appropriate example. (05)

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Sub : Embedded System Design
May 14, 2012

Year: **F. Y. M.Tech**

Branch: **Comp. Engg.**

Academic Year: **2011-12**

Duration : **Three Hours**

Max. Marks: **100**

Instructions : **Solve total five Questions.**
Question No1. is compulsory.

- Q.1.** Explain in details the case study of an Electronic Control Unit (ECU) for Engine Management of a Four Stroke Internal Combustion(IC) Petrol Engine . (20)
- Q.2.** (i) Draw the block diagram of ARM7-TDMI Core & explain it's Register Set. What is the need for a Thumb Instruction Set?
(ii) Draw the pipeline stages of ARM-11 family & explain the following:
(a) Need of TCM & HUM Buffers.
(b) Intelligent Energy Management (IEM) & Trust Zone features. (20)
- Q.3.** (i) What is a RTOS? Explain the differences between GPOS & RTOS.
(ii) Draw the internal architecture of a RT-Linux Kernel & the structure of a RT Application. Explain the scheduling policies deployed in RT-Linux. (20)
- Q.4.** (i) Explain the need & operation of a Differential G.P.S. .
(ii) Explain the G.P.S. C/A Code Signal structure & it's generation..
(iii) Explain in details the G.P.S. Data format. (20)
- Q.5.** (i) Explain the following w.r.t. Bluetooth Technology:
(a) Specifications (b) Addressing (c) State Transition Diagram
(d) Network Topologies.
(ii) Write a note on PID Controllers & their applications. (20)
- Q.6.** (i) Explain the types of CAN. Draw the Data Frame for a CAN 2.0B Controller. Explain the principle of Arbitration & Error Management in CAN Controllers.
(ii) Explain in details the RF-ID technology & enlist its applications. (20)
