

LATE WORK NOT ACCEPTED and receives **ZERO** credit regardless of the reason.

See your email for due date.

Take Home Exam Rules

1. **LATE WORK NOT ACCEPTED** and receives **ZERO** credit.
2. You may use any reference materials (books, handouts, notes, ...) including the Internet.
3. Collaboration (COLLABORATION IS NOT COPYING) is acceptable however partial credit will be given sparingly.
4. All work shall be the ORIGINAL work of the person whose name appears on the submitted work except question 2.
5. Copying is NOT allowed from ANY source except question 2.
6. **Suspected** coping from any source (electronic, printed, or otherwise), cited or otherwise, shall receive, at a minimum, ZERO credit for this exam except question 2. Other action and penalties also pursued.
7. Properly formatted and printed exam answer shall be turned in BEFORE the due date and time.

ENJOY :)

Assume all commands are executed on a RPi running Raspbian Stretch 4.4.80-v7+ using the bash shell **without** completes.

1. By hand (in your vim document), calculate and give the missing addresses and netmasks. **Show your work.**

Network (DDN)	IP (DDN)	Netmask (CIDR)	Broadcast (DDN)
	10.129.4.5	/13	
172.81.32.0			172.81.47.255

2. Write a program in C that fetches a web page. Find a TCP client program tutorial to help you write the program. Copying allow if and only if **cited**. Use the following HTTP request string:

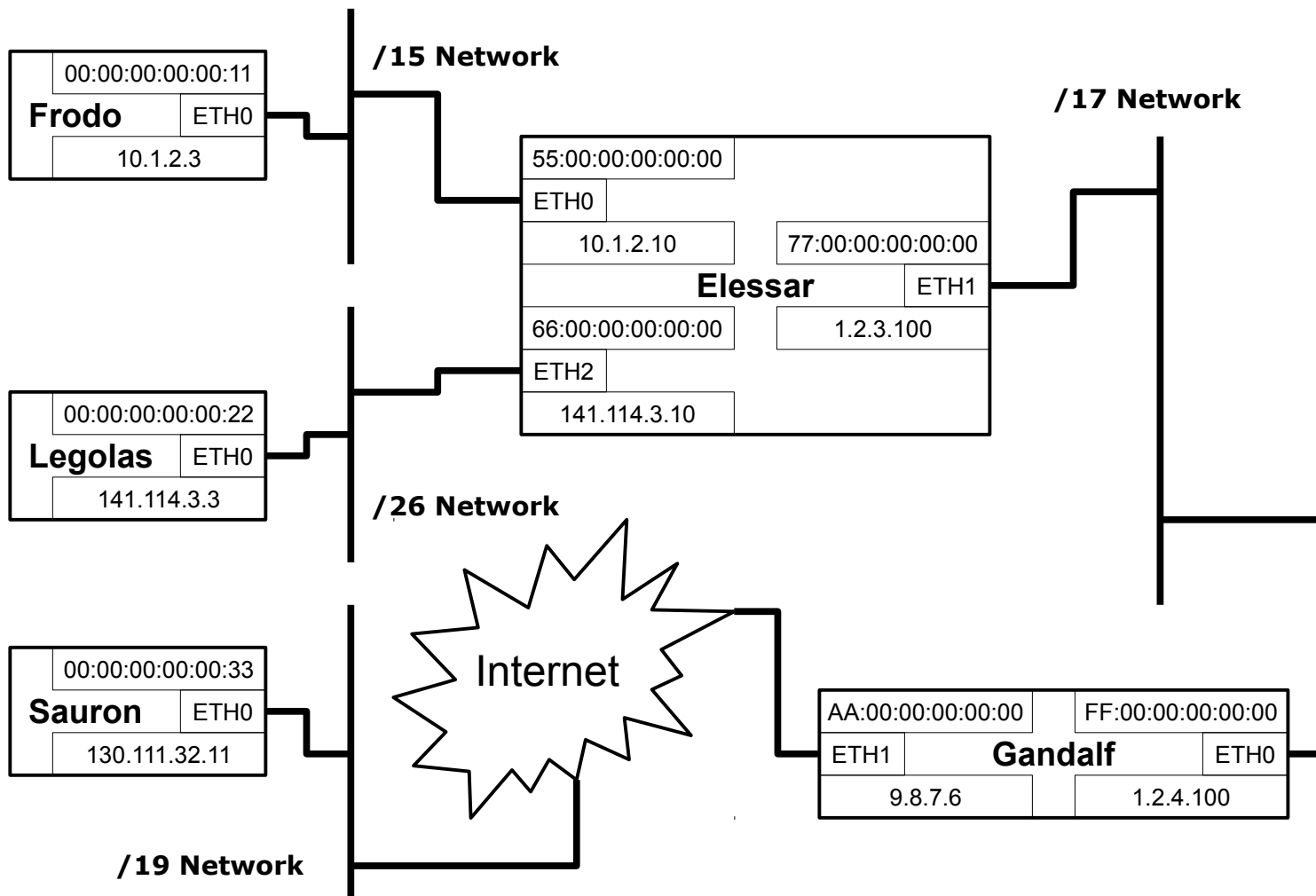
`"GET /index.html HTTP/1.1\r\nhost: myhost\r\n\r\n"`

Have the program accept the hostname and port on the command line.

- a) State the URL of the tutorial
- b) Include the comment source code of your program

Although you may use other's code (cited), be sure you understand how the program works - that is the process of connecting to a TCP server. You should be able to explain the operation and purpose of every function call and its arguments.

3. Build a routing table for router “Elessar” and host “Legalos”. Give the tables using the same output format at route -n.



4. Show how the source and destination MAC and IP addresses change as an Ethernet frame is sent from host “Frodo” to host “Legolas”.
5. Show how the source and destination MAC and IP addresses change as an Ethernet frame is sent from host “Legolas” to host “Gandalf”.

6. Write a php **function** that creates a numbered table of size \$w wide and \$h high. The width and height are passed to the function. For example if \$w is 5 and \$h is 4, then the table would appear as follows:

0	4	8	12	16
1	5	9	13	17
2	6	10	14	18
3	7	11	15	19

7. An sqlite3 database is created as follows

```
$ sqlite3 ex.db
sqlite> create table bitcoin(date text, time text, price real, volume real, mined real, fee real);
sqlite> .separator ","
sqlite> .import bitcoindata.csv bitcoin
```

Write and give the sql query that give the date, time, and value for the highest bitcoin price from the database in the past month. The csv data contain bitcoin information since inception.

8. Install the large American dictionary word list on your RPi. Then write a perl script that prints a histogram of the occurrence of upper and lower case letters (only.) Use asterisks for the histogram. Printing horizontal is acceptable. Normalize to 70. Write concise code. Example (partial) output from around the middle:

```
W
X
Y
Z
a*****
b*****
c*****
d*****
e*****
```

For your answer

- Include the command(s) to install the dictionary
 - Include your commented perl source code
9. While listing processes one day on your company's main NFS fileserver, you notice the following process:

```
harry      495  93.1  23.8  94388 39184 tty1      R+ 13:26   1:19 crack-passwd
```

Discuss security AND ethical implications of discovering this process. You have full administrative access to this machine (the main NFS fileserver) but it was given **only for installing and updating circuit simulation software** (exported to your engineering group's computers through the main NFS fileserver.)

10. Use `enscript` to print your exam answers to a PDF file on your RPi with the format below. Copy the PDF to a computer that is set up to print to a printer. Print the PDF. Turn in the printed copy before the due date and time. To answer this question, include **all** commands required to produce a PDF on your RPi. Example formatting follows.

ECE 331	Exam 02	Andrew Sheaff

The format is as follows. On EVERY page place:

- a) In the upper left corner place the string (no quotes) "ECE 331"
- b) Top, centered, the string (no quotes) "Exam 01"
- c) Upper right corner, your name.