

First Third-Term Exam

Open book and notes; Take Home

Due Friday Oct. 8th before noon.

- ⊕ Do not forget to write your name on the first page. Initial each subsequent page.
- ⊕ Be **neat and precise**. I will not grade answers I cannot read.
- ⊕ You should draw simple figures if you think it will make your answers clearer.
- ⊕ Good luck and remember, brevity is the soul of wit

- All problems are mandatory
- I cannot stress this point enough: **Be precise**. If you have written something incorrect along with the correct answer, you should **not** expect to get all the points. I will grade based upon what you **wrote**, not what you **meant**.
- Maximum possible points: 50 + bonus.

Name: _____

Problem	Points
1	
2	
3	
4	
5	
Total	

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
 1 2 4 8 16 32 64 128 256 512 1024 2048 4096 8192 16384 32768 65536

3. Internet Protocol

(a) Suppose you are allocated the prefix 44.100.101.0/23.

i. How many IP addresses do you control? (1 point)

ii. Divide your allocation into three subnets, two of equal size and one double the size of the others. For each subnet, list the following: (3 points)

	Subnet-id	Mask	Broadcast	# hosts	Highest Address	Lowest Address
Subnet 0						
Subnet 1						
Subnet 2						

(b) Suppose a IP fragment with ID 1023, offset 128, MF=1, DF=0, TTL=17 and payload size 532 bytes is transmitted on a link with MTU 276 bytes. List the header values for the resultant fragments. You may assume no IP options; IP Len includes header. You may assume that link MTU of x means an IP datagram of total length x can be sent over the link. (3 points)

	IP ID	Offset	MF	DF	TTL	IP Len.
Fragment 0						
Fragment 1						
Fragment 2						

(c) IP reassembly code receives a datagram with previously unseen Identification=417, Total Len **1044** bytes, MF flag=1, and offset=**8191**. How should this datagram be processed. (3 points)

5. Mobile IP, Implementation

(a) What are the duties of the Home Agent in Mobile-IP?. (4 points)

(b) Function `dispatch` has the following prototype:

```
void dispatch(int *sd_set, int n_sd, void (*net_reader)(int),
              void (*ui_updater)(void));
```

`dispatch` takes in an array of socket descriptors (`sd-set`) of length `n-sd`, and two functions `net-reader` and `ui-updater`. Provide an implementation of `dispatch` that invokes `net-reader` for every descriptor that is ready to read, and invokes `ui-updater` every 1/24th of a second. `dispatch` should continue this read/UI-update cycle forever. Do not use multiple processes, threads or signals (e.g., `SIGALRM`). (6 points)

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