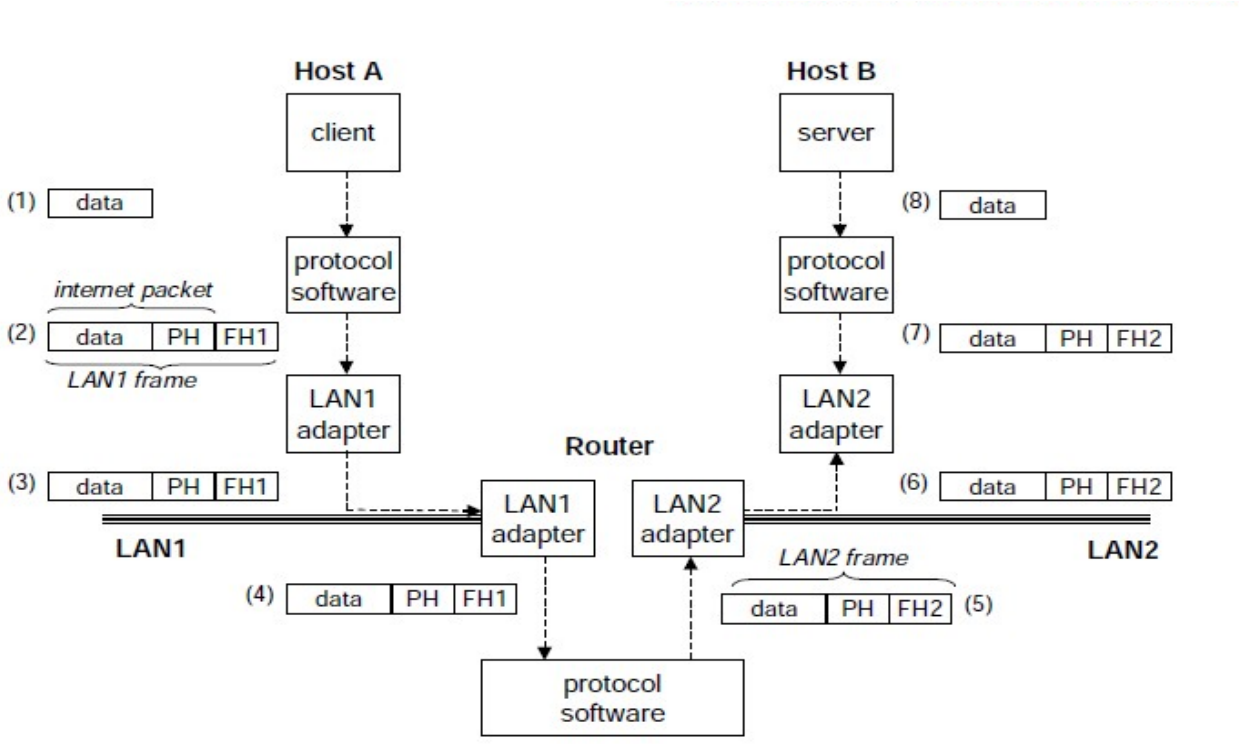
Homework #10 **M1522.000800 System Programming**

Sample Solution

Question 1

Transferring Data Over an Internet

The following picture shows an example of how hosts and routers use the internet protocol to transfer data across incompatible LANs. The example internet consists of two `LANs` connected by a router. A client running on **`Host A`**, which is attached to **`LAN1`**, sends a sequence of data bytes to a server running on **`Host B`**, which is attached to **`LAN2`**. Show how the data packet can changes its form as it goes through this protocol. Explain what each forms mean.



=> PH : The address of Host B
=> FH1 : The address of the Router
=> FH2 : The address of Host B
=> Data : Real User Data

Question 2
Internet Domain Names

Internet applications retrieve arbitrary host entries from the DNS database by calling the `gethostbyname` and `gethostbyaddr` functions. Each host entry is an equivalence class domain names and IP addresses. There are different kinds of mappings between domain names and IP addresses. In the most general case, multiple domain names can be mapped to multiple IP addresses. `hostinfo` program reads a domain name from the command line and displays the corresponding host entry. If we execute 3 times this program for getting 'www.aol.com' host entry, we can get this results.

```
$ ./hostinfo www.aol.com
$ official hostname: aol.com
$ address: 64.12.79.57
$ address: 64.12.89.186
$ address: 149.174.107.97
$ address: 149.174.110.102
$ address: 207.200.74.38
$ ./hostinfo www.aol.com
$ official hostname: aol.com
$ address: 149.174.107.97
$ address: 149.174.110.102
$ address: 207.200.74.38
$ address: 64.12.79.57
$ address: 64.12.89.186
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$ address: 207.200.74.38
$ address: 64.12.79.57
$ address: 64.12.89.186
$ address: 149.174.107.97
```

Explain why `hostinfo` displays given multiple address corresponding 'www.aol.com' with different ordering at each time. How might this ordering be useful?

=> Because of DNS round-robin. It is useful to make balance of domain name queries.

Question 3
Web Contents

Explain how an Internet browser resolves an URL (z.B. http://www.bbc.com/news/blogs-news-from-elsewhere-32549301) to an IP address.

=> The URL has three parts :
- The protocol specifier : http:
- The domain name : www.bbc.com
- The page location : /news/blogs-news-from-elsewhere-32549301

=> It's only the domain name that has an IP address associated with it. The process of finding the IP address is achieved by searching the DNS(Domain Name Servers) until a match a the domain name is found.