Sage deBrum
CS430

HW#9

1. Routing deals with the path that a packet will take from sender to receiver, whereas forwarding deals with the next node that a packet will move on to next from where it is at.
2. Circuit switching allows more of a guarantee that a packet will reach its destination because nodes will allocate resources for the route of the data being transferred. This is a double-edged sword, though, in that allocating resources and dedicating them to only one transaction makes circuit-switched networks harder to scale. Packet switched networks allow for data to be broken up and take different routes if necessary to reach the destination quickly. The disadvantage with that would be that packets can get dropped as nodes become overwhelmed, among other reasons.
3. Security is perhaps the most important network service in my view. To use everyday transactions as an analogy, it would be faster for me to have my purchases done if vendors were allowed to hold my personal financial information (i.e. credit card info). I wouldn't have to swipe a card if they just noticed who I was and just did the transaction input themselves. This, though, seems much too dangerous and prone to abuse (perhaps others can pretend they are me and use my card). Because of this, I would happily take a little longer and do more steps to protect my sensitive information. Likewise, I feel that users online would be fine with a bit more waiting and going through a few more steps if it meant improved security of their information.
4. A router's switching fabric is the structure and method that a router has in order to deal with incoming packets that it has to send out.
5.

- For a crossbar setup, every input interface connects to every output interface, so if there was a packet at every input that is to be forwarded to their corresponding, separate output interfaces, there would be no delay.

6. The longest prefix match in forwarding is a router's way of doing the best job that it can in sending packets closer towards their destination. Using the router's forwarding table, a router will match the most bits that it can on the left side of the destination address and send that packet to the interface that has the most matches on the address's prefix in the forwarding table. If the bits can't be matched to any specific interface, then a default interface is where the packet is sent (for another router to figure out instead).

7.

11100000 00****** ******** ******** => 0
11100000 01000000 ******** ******** =>1
11100001 01****** ******** ******** => 2
Default =>3

8. Since 11001000 10010001 01010001 01010101 does not fall in the range of any of the link interfaces (being too low to reach link interface 0's range), the default link interface of 3 is chosen.
9. Because 11100001 01000000 11000011 00111100 matches the longest prefix in the forwarding table, link interface 1 would be chosen as the interface to forward the packet. We can see, too, that it falls within the range of addresses that link interface 1 is associated with.
10. Finding that the destination address does not fall within the range of any of the link interfaces, the default link interface is chosen as the place where the packet is forwarded to (i.e. link interface 3).