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a. Why didn't the original program forward packets between the hosts?
Because the two host did not have a any gateway to link to the router

b. Is the line ' r1.cmd('sysctl -w net.ipv4.ip_forward=1') ' required?

 yes , this line is required because it allows the router to forward packets

c. Intentionally break your working program, e.g.: change a subnet length, IP
address, or default route for a host. Explain why your change caused the network
to break.
This breaks the program because it cant handle 32 bits.

```
Last login: Wed Apr  4 19:21:41 PDT 2018 on tty1
Welcome to Ubuntu 14.04.4 LTS (GNU/Linux 4.2.0-27-generic i686)


 * Documentation:  https://help.ubuntu.com/
New release '16.04.4 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


mininet@mininet-vm:~$ sudo python legacy_router.py
*** adding controllers\m*** add switches
*** Add hosts
*** Add links
*** Starting network
```

```
mininet> h2 ping h1
PING 10.0.1.100 (10.0.1.100) 56(84) bytes of data.
64 bytes from 10.0.1.100: icmp_seq=1 ttl=63 time=0.045 ms
64 bytes from 10.0.1.100: icmp_seq=2 ttl=63 time=0.043 ms
64 bytes from 10.0.1.100: icmp_seq=3 ttl=63 time=0.056 ms
64 bytes from 10.0.1.100: icmp_seq=4 ttl=63 time=0.037 ms
64 bytes from 10.0.1.100: icmp_seq=5 ttl=63 time=0.042 ms
64 bytes from 10.0.1.100: icmp_seq=6 ttl=63 time=0.096 ms
64 bytes from 10.0.1.100: icmp_seq=7 ttl=63 time=0.041 ms
64 bytes from 10.0.1.100: icmp_seq=8 ttl=63 time=0.042 ms
^C
--- 10.0.1.100 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7001ms
rtt min/avg/max/mdev = 0.037/0.050/0.096/0.018 ms
```