ICS HW 10 Solution

May 16, 2020

1 Dynamic Linking

Given the PLT table:

```
PLT[1] <free>
400450: jmpq *0x20055a(%rip)
400456: pushq $0x0
40045b: jmpq 0x400440 PLT[2] <printf>
400460: jmpq *0x200552(%rip)
400466: pushq $0x1
40046b: jmpq 0x400440 ...


PLT[5] <malloc>
400490: jmpq *0x20053a(%rip)
400496: pushq $0x4
40049b: jmpq 0x400440
```

1. Please fill in the GOT table before the execution of main

Address	Entry	Contents	Description
0x600998	GOT[0]	--	Addr of .dynamic
0x6009a0	GOT[1]	--	Addr of reloc entries
0x6009a8	GOT[2]	--	Addr of dynamic linker
0x6009b0	GOT[3]	0x400456	Entry of free
0x6009b8	GOT[4]	0x500566	Entry of printf
0x6009d0	GOT[7]	0x400496	Entry of malloc

2. We have the following code:

```c
1: #include <stdlib.h>
2: void main(){
3:   int a = 1;
4:   printf("%d\n", a);
5:   char *c;
6:   c = (char*)malloc(4);
7:   printf("%d\n",a);
8:   free(c);
9: }
```

The addresses of functions are given:

printf	0x00007ffff7a81cf0
malloc	0x00007ffff7aacfc0
free	0x00007ffff7aad600

Which entry of the GOT table will change and what will it be after the execution of:

line 4:   GOT[4]: 0x00007ffff7a81cf0

line 6:   GOT[7]: 0x00007ffff7aacfc0

line 7:   no change

line 8:   GOT[3]: 0x00007ffff7aad600

2   Network

11.3.2 (textbook) shows examples of multiple domain names mapped to the same IP address, and also a domain name mapped to multiple IP addresses.

1. Think about the benefits of mapping a domain names to multiple IP addresses.

    ANS: For example, to obtain good availability of your server, you might want multiple servers, each with a different IP address, to serve the same web page to your clients.

2. In shared web hosting case, many websites can reside on one web server (sharing a single IP address) connected to the Internet. How does this server decide which website to show the user?

    ANS: HTTP request includes the host name (refer to telnet), the server can use this information to decide which domain to serve.