

CS 24: Introduction to Computing Systems

Lecture 5 Exercises

Name:

(a) 00000000004004f0 <mystery>:

```
4004f0: 85 ff      test    %edi,%edi
4004f2: 74 08      je      4004fc <mystery+0x0c>
4004f4: 0f af f7   imul    %edi,%esi
4004f7: 83 c7 ff   add     $0xffffffff,%edi
4004fa: 75 f8      jne     4004f4 <mystery+0x04>
4004fc: 89 f0      mov     %esi,%eax
4004fe: c3         retq
```

Handwritten notes for (a):
if (edi == 0) {
 return esi;
} while (edi != 0) {
 add \$0xffffffff, %edi;
}

(b) 00000000004004f0 <mystery>:

```
4004f0: 83 ff 03   cmp     $0x3,%edi
4004f3: 72 1e      jb      400513 <mystery+0x23>
4004f5: b1 01      mov     $0x1,%cl
4004f7: 7c 17      jnl     400510 <mystery+0x20>
4004f9: 89 fe      mov     %edi,%esi
4004fb: bf 02 00 00 00 mov     $0x2,%edi
400500: 89 f0      mov     %esi,%eax
400502: 99         cld
400503: f7 ff      idiv    %edi
400505: 85 d2      test    %edx,%edx
400507: 74 0a      je      400513 <mystery+0x23>
400509: 83 c7 01   add     $0x1,%edi
40050c: 39 f7      cmp     %esi,%edi
40050e: 7c f0      jnl     400500 <mystery+0x10>
400510: 89 c8      mov     %ecx,%eax
400512: c3         retq
400513: 31 c9      xor     %ecx,%ecx
400515: 89 c8      mov     %ecx,%eax
400517: c3         retq
```

Handwritten notes for (b):
cl = 1
esi = edi
edi = 2
eax = esi
eax = eax / edi and edx = eax % edi
edi - 1 < 0
edi < esi
for (i = 0; i < x; i++)
 if (x % i == 0) {
 return 0;
 }
return 1;

~~void swap(int* rdi, int* rsi)~~
 (c) 0000000000000000 <mystery>:
 0: 48 8b 07 mov (%rdi),%rax
 3: 48 8b 16 mov (%rsi),%rdx
 6: 48 89 17 mov %rdx,(%rdi)
 9: 48 89 06 mov %rax,(%rsi)
 c: c3 retq

temporary variable
 rax = *rdi
 rdx = *rsi
 *rdi = rdx

0000000000000000 <mystery>:
 0: 8b 07 mov (%rdi),%eax
 2: 8b 16 mov (%rsi),%edx
 4: 89 17 mov %edx,(%rdi)
 6: 89 06 mov %eax,(%rsi)
 8: c3 retq

0000000000000000 <mystery>:
 0: 0f b7 07 movzwl (%rdi),%eax
 3: 0f b7 16 movzwl (%rsi),%edx
 6: 66 89 17 mov %dx,(%rdi)
 9: 66 89 06 mov %ax,(%rsi)
 c: c3 retq