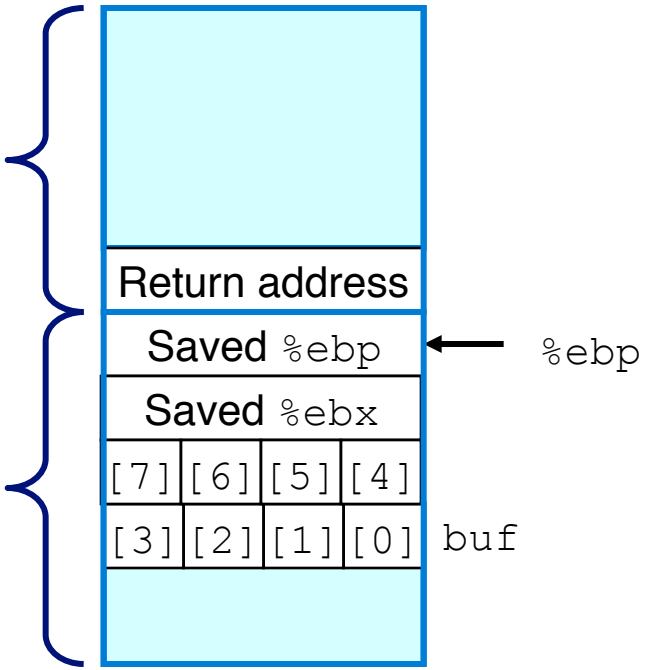
- Open question:
- *residents* in assembly?

- Exam time?
  - 8:15-10:45
  - 9:30-noon
  - 8:15-noon
  - 9:30-10:45, 2:35-3:50
  - 2:45-5:00
- Labs
- http://www.nand2tetris.org/

```
char *gets(char *s)
{
   int c;
   char *dest = s;
   int gotchar = 0;
   while ((c = getchar()) != '\n' && c != EOF){
    *dest++ = c;
    gotchar = 1;
   }
   *dest++ = '\0';
   if (c == EOF && !gotchar)
    return NULL;
   return s;
}

void echo()
{
   char buf[8];
   gets(buf);
   puts(buf);
}
```



Question:

Who is Steven Spielberg's father and why is more famous to normal people than Steven is?

Answer:

His name is Mr. Sielberg :) -- Arnold Spielberg. He is famous because he was one of the engineers that made BIZMAC (reading, page 56)

In the book we saw two Binary Operations, SAL and SHL. The book states that those operators have the same effect in 32 bit machines, filling from the right with zeros. My question is whether they differ in x86-64 machines?

Answer: The operators have again the same effect: The shift arithmetic left (SAL) and shift logical left (SHL) instructions perform the same operation; they shift the bits in the destination operand to the left (toward more significant bit locations).

Question: Fill in the blank based on the assembly code.

(A)

```
int func1(int x){
  __________;

  x = ___________;

  return x;
}

<func1>:
push   %ebp
mov    %esp,%ebp
sub    $0x10,%esp
mov    -0x4(%ebp),%eax
mov    (%eax),%eax
shl    $0x4,%eax
mov    %eax,-0x8(%ebp)
mov    -0x8(%ebp),%eax
leave
ret
```

****

(B)

```
int func2(int x, int *y) {

   int z = _______________;

   *y = _______________;

   return *y;

<func2>:
push   %ebp
mov    %esp,%ebp
sub    $0x10,%esp
mov    0xc(%ebp),%eax
mov    (%eax),%eax
xor    0x8(%ebp),%eax
mov    %eax,-0x4(%ebp)
mov    -0x4(%ebp),%eax
mov    0x8(%ebp),%edx
or     %eax,%edx
mov    0xc(%ebp),%eax
mov    %edx,(%eax)
mov    0xc(%ebp),%eax
mov    (%eax),%eax
leave
ret
```

- //
- //

- Answers:

```
int func1(int x) {
  int *y;
  x = *y << 4;

  return x;
}

int func2(int x, int *y) {
   int z = x ^ *y;
   *y = x|z;
   return *y;
}
```

- Book chapter

- Book chapter

- Tapes / spinning disks
- Word length
- Register structure (counter, accumulator, etc.)
- # addresses
- I/O
- Floating point hardware
- Transistor vs. vacuum tube and core memory

- Intermission
- http://www.thedailyshow.com/full-episodes/thu-october-11-2012-paul-thomas-anderson
- 6:30-9:00

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
c	X	X	X	p	p	p	p	i	i	i	i	X	X	X	X	d	d	d	d	d	d	d	d	s	s	X	X	X	X	X	X

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
c	X	X	X	p	p	p	p	i	i	i	i	X	X	X	X

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
d	d	d	d	d	d	d	d	s	s	X	X	X	X	X	X

b) 32

d) 8

e) 8

1) choice 3: return 15*x

2) choice 5: return x/16

3) choice 6: return (x>>31)

```
for (result = 0; x>y; result++){
    x--;
    y++;
}
result++;
```

- 2.84b, 2.88(a-e), 2.67, 2.83, 2.842 2.88, 3.56, 3.58, 3.59, 3.62