

COMPSCI 210 S1T

Computer Systems

Data Representation

Bit Operations

Agenda & Reading

- ◆ Agenda:
 - Bit Operations
 - ◆ NOT
 - ◆ AND
 - ◆ OR
 - ◆ EOR
 - ◆ Left Shift
 - ◆ Right Shift with Sign Fill
 - ◆ Right Shift with Zero Fill
- ◆ Animation
 - 04BitOprs.htm
- ◆ Examples
 - 04\BinOps.html
 - 04\BitOperators.java
- ◆ Exercise:
 - 04

Bit Operations: And

- ◆ Animation:
04BitOprs.htm

◆ Example

```
0011 1100
&0001 1111
-----
```

◆ Example

```
0011 1100
&0101 0101
-----
```

◆ Exercise

```
1010 0001
&0101 1111
-----
```

Or

◆ Example

```
0011 1100
|0001 1111
-----
```

◆ Example

```
0001 1100
|0101 0101
-----
```

◆ Exercise

```
1010 0001
|0101 1111
-----
```

Exclusive Or

◆ Example

0011 1100
^0001 1111

◆ Example

0001 1100
^0101 0101

◆ Exercise

1010 0001
^0101 1111

Left Shift

◆ Example

0001 0101 << 2

◆ Example

0000 0101 << 3

◆ Exercise

0000 1100 << 3

Right Shift (sign fill)

◆ Example

0001 0101 >> 2

◆ Example

1001 0011 >> 2

◆ Exercise

1010 0001 >> 3

Right Shift (zero fill)

◆ Example

0001 0101 >>> 2

◆ Example

1001 0011 >>> 2

◆ Exercise

1010 0001 >>> 3