

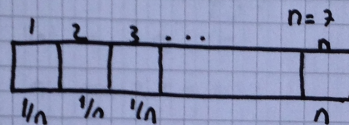
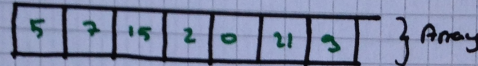
(01/10/2015)

- Linear search & big O notation
- Compiling & executing Java programs
- Representation of numeric data

Effectiveness vs Efficiency
doing the job. time & space
 number of operations

Linear search:

$\frac{1}{2}$ chance to appear



→ Asymptotic behavior: Very large values of n
→ $n \rightarrow \infty$

Expectation: $1 \cdot \frac{1}{n} + 2 \cdot \frac{1}{n} + \dots + n \cdot \frac{1}{n}$

$$= \frac{1}{n} (1 + 2 + 3 + \dots + n)$$

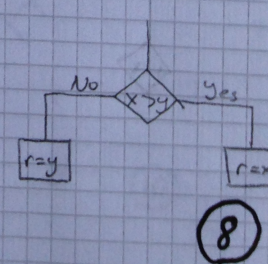
$$= \frac{1}{n} \cdot \frac{n \times (n+1)}{2} = \frac{n}{2} + \frac{1}{2} = \text{Expected number of comparisons}$$

$$\frac{n}{2} + \frac{1}{2} \approx n \rightarrow O(n)$$

Compiling & Executing Java Programs

```
public class HelloWorld {  
    public static void main(String[] args) {  
        System.out.println("Hello World")  
    }  
}
```

```
public static int max2(int x, int y) {  
    int r;  
    if (x > y)  
        r = x;  
    else  
        r = y;  
    return (r);  
}
```



For max 3:

```
public class HelloWorld {  
    public static void main(String[] args) {  
        int r = max3(5, 10, 15);  
        System.out.println("max 3 = " + r);  
    }  
    public static int max2(int x, int y) {  
        int r;  
        if (x > y)  
            r = x;  
        else  
            r = y;  
        return(r);  
    }  
    public static int max3(int x, int y, int z) {  
        int r;  
        r = max2(x, y);  
        r = max2(r, z);  
        return(r);  
    }  
}
```

What about max 4;

LOGIC ERROR:

```
static int max4 (inta, intb, intc, intd) {
```

```
    int r;
```

```
    r = max2(a, b);
```

```
    r = max2(c, d);
```

```
    r = max(r, r);
```

```
    return (r);
```

```
}
```

→ we will lost a, b because
program will only assign c,d again.

How can we modify?

```
int r1, r2, r;
```

```
r1 = max2(a, b);
```

```
r2 = max2(c, d);
```

```
return (r);
```

```
}
```

We can do it like that too...

```
r = max2(a, b);
```

```
r = max2(r, c);
```

```
r = max2(r, d);
```

```
return (r);
```

```
}
```

→ Let's make program to ask the a, b, c, d values;

```
import java.util.Scanner;
```

```
public class HelloWorld {
```

```
    public static void main (String[] args) {
```

```
        int x1;
```

```
        Scanner scan = new Scanner (System.in);
```

```
        // Do it for the x2, x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15, x16, x17, x18, x19, x20, x21, x22, x23, x24, x25, x26, x27, x28, x29, x30, x31, x32, x33, x34, x35, x36, x37, x38, x39, x40, x41, x42, x43, x44, x45, x46, x47, x48, x49, x50, x51, x52, x53, x54, x55, x56, x57, x58, x59, x60, x61, x62, x63, x64, x65, x66, x67, x68, x69, x70, x71, x72, x73, x74, x75, x76, x77, x78, x79, x80, x81, x82, x83, x84, x85, x86, x87, x88, x89, x90, x91, x92, x93, x94, x95, x96, x97, x98, x99, x100
```

```
        System.out.println ("Enter an integer number");
```

```
        x1 = scan.nextInt();
```