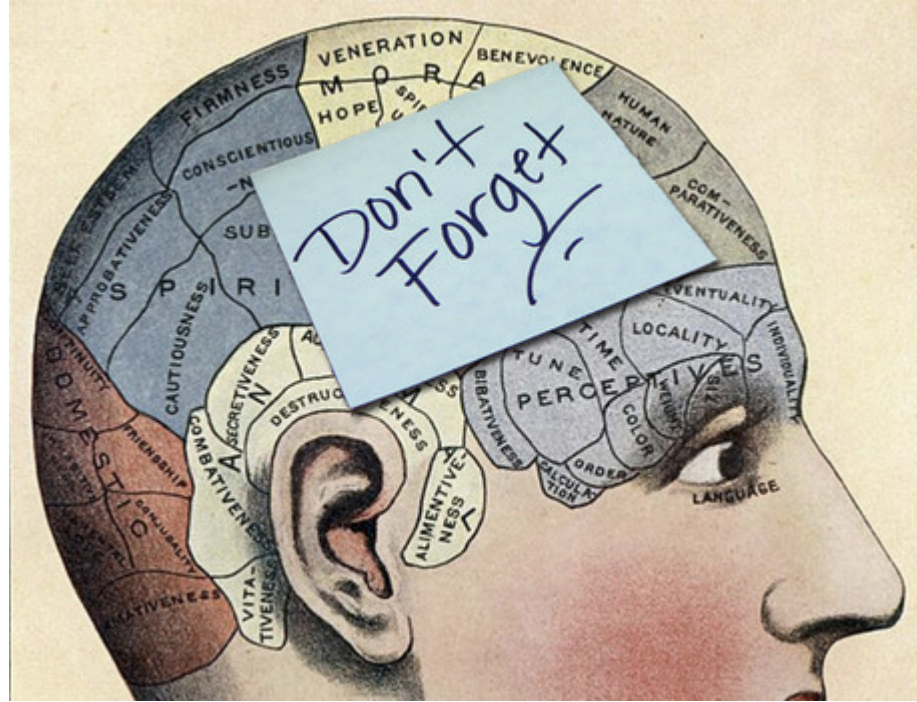


Memory!



Java references

```
class Blob {...}
```

```
...
```

```
Blob b1 = new Blob();
```

```
Blob b2 = new Blob();
```

Java references

```
class Blob {...}
```

```
...
```

```
Blob b1 = new Blob();
```

```
Blob b2 = b1;
```

Pointer example

```
int *p;    // &p == 0x0;  
int x = 6; // &x == 0xf8;  
int y = 3; // &y == 0x4;
```

Pointer example

```
int *p;    // &p == 0x0;  
int x = 6; // &x == 0xf8;  
int y = 3; // &y == 0x4;  
p = &x;
```

Pointer example

```
int *p;    // &p == 0x0;  
int x = 6; // &x == 0xf8;  
int y = 3; // &y == 0x4;  
p = &x;  
y = 1 + *p;
```

Pointer example

```
int *p;    // &p == 0x0;  
int x = 6; // &x == 0xf8;  
int y = 3; // &y == 0x4;  
p = &x;  
y = 1 + *p;  
*p == 100;
```

Another pointer example

```
void swap(int* p1, int* p2) {  
    int temp = *p1;  
    *p1 = *p2;  
    *p2 = temp;  
}  
  
void main() {  
    int x = 5;  
    int y = 3;  
    // x is 5, y is 3  
    swap(&x, &y);  
    // x is 3, y is 5  
}
```


Arrays in C

```
int a[3]; // &a == 0x10
```

```
a[0] = 0xff;
```

```
a[2] = 0xcc;
```

```
a[3] = 0xbad; // !?
```

```
a[-1] = 0xbad; // !?
```

Arrays in C → Pointers

```
int a[3]; // &a == 0x10
```

```
int *b = &a;
```

```
b[0] = 0xff;
```

```
b[2] = 0xcc;
```

```
b[3] = 0xbad; // !?
```

```
b[-1] = 0xbad; // !?
```

Pointer arithmetic

```
int a[3]; // &a == 0x10
```

```
int *b = &a[1];
```

```
b[-1] = 0xff;
```

```
b[1] = 0xcc;
```

```
b[2] = 0xbad; // !?
```

```
b[-2] = 0xbad; // !?
```

Arrays in C

```
int a[3]; // &a == 0x10  
int *b = &a;  
b[0] = 0xff; // *(b + 0)  
b[2] = 0xcc; // *(b + 2)
```

Arrays in C

```
int a[3]; // &a == 0x10  
int *b = &a;  
*(b + 0) = 0xff; // b[0]  
*(b + 2) = 0xcc; // b[2]
```