Fun with *Pointers

Binky the pointer!

http://www.youtube.com/watch?v=f-pJlnpkLp0

Warm-up

```
int *p;
int a;


p = &a;
*p = 10

cout << a; // Whats the output?
```

```cpp
int *x;
int *y;

x = new int;
y = x;
*y = 10;

cout << *x; // Whats the output?
```

```cpp
int *x;
int *y;


y = x;
y = new int;
*y = 10;


cout << *x; // What happens?
```

int *x, *y;

x

0x1234

y

0x1678

---

y = x;

x

0x1234

y

0x1234

---

y = new int;
*y = 10

x

0x1234

y

0x1000

Add: 0x1000
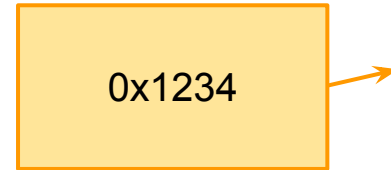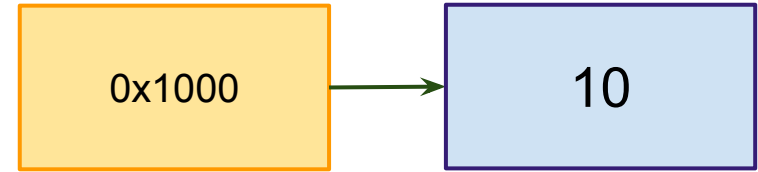
10
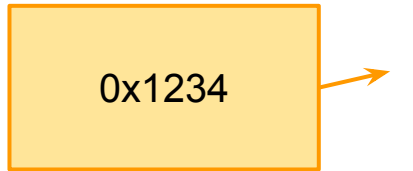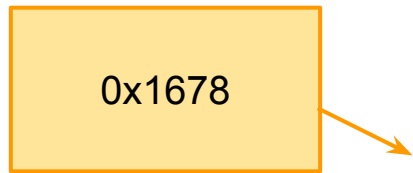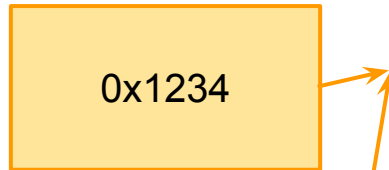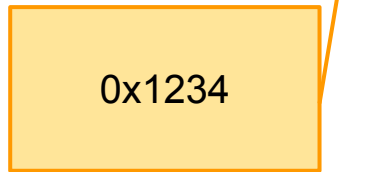
Passing arguments to Functions

- By value

- By reference

- By pointer

Pass argument by value

```cpp
void fn ( int copy) {
    copy = 10;
}

int main() {
    int x = 200;
    fn(x);
    cout << x; // Whats the output?
}
```

int x=200;
fn (x);

x

200
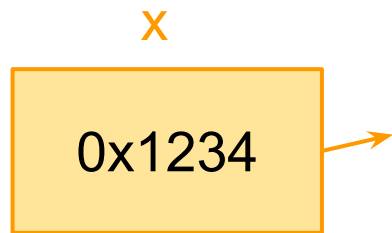
fn (int copy)

x

200

copy
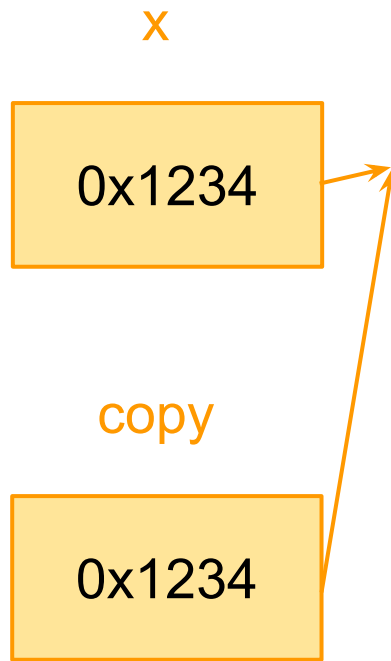
200

copy = 10

x

200

copy

10

Pass pointer by value

```cpp
void fn ( int * copy) {
    copy = new int;
    *copy = 10;
}

int main() {
    int *x;
    fn(x);
    cout << *x; // Whats the output?
}
```
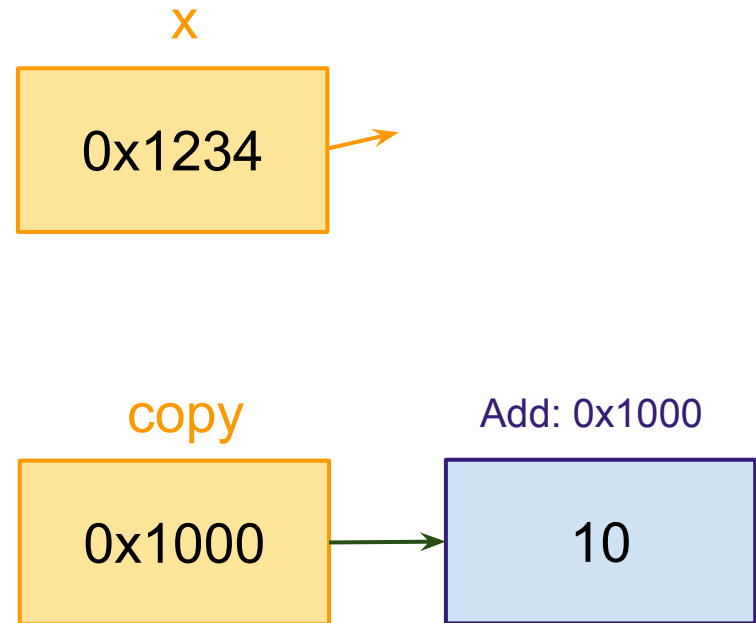
int *x;
fn (x);

x

0x1234

fn (int * copy)

x

0x1234

copy

0x1234

copy = new int;
*copy = 10

x

0x1234

copy

Add: 0x1000

0x1000

10

By reference

```cpp
void fn ( int * &copy) {
    copy = new int;
    *copy = 10;
}

int main() {
    int *x;
    fn(x);
    cout << *x; // Whats the output?
}
```

int *x;
fn (x);

x

0x1234

fn (int * &copy)

x OR copy

0x1234

copy = new int;
*copy = 10

copy OR x

0x1000

Add: 0x1000

10

By pointer

```cpp
void fn ( int * *copy) {
    *copy = new int;
    **copy = 10;
}

int main() {
    int *x;
    fn(&x);
    cout << *x; // Whats the output?
}
```
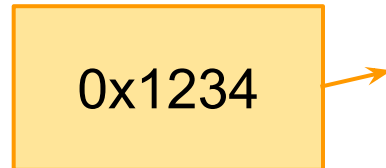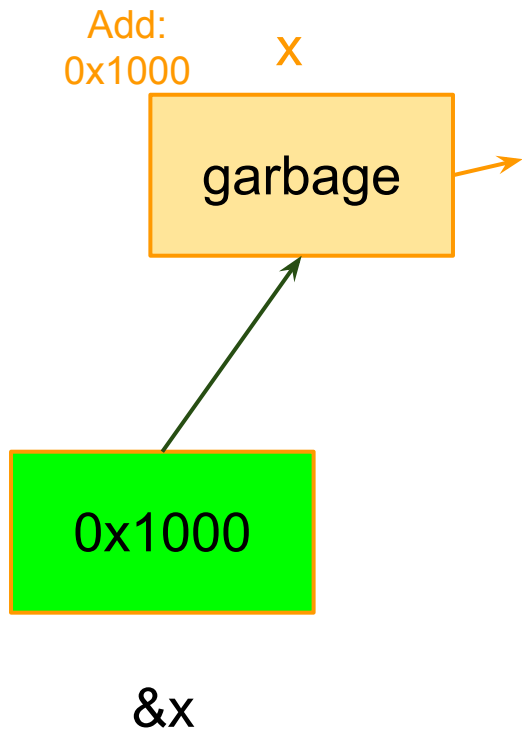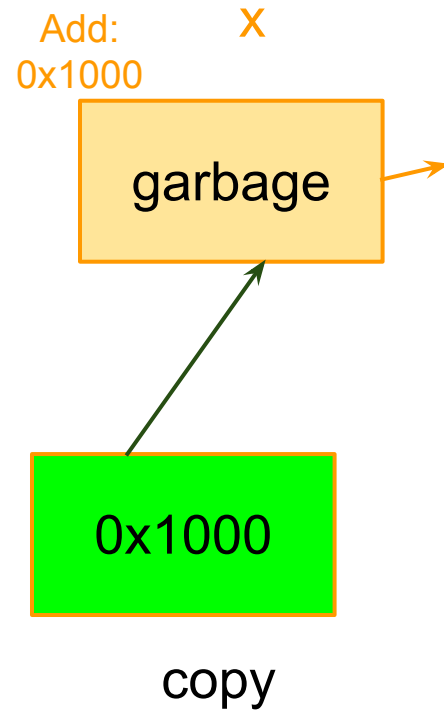
int *x;
fn (&x);

fn (int * *copy)

*copy = new int;
**copy = 10

Add:
0x1000

X

garbage

0x1000

&x

Add:
0x1000

X

garbage

0x1000

copy

Add:
0x1000

X

0x1004

Add:
0x1004

10

0x1000

copy