Week 5 Review

Rob Bowden

Stack

- One stack frame per “active” function call
- Stores local variables and passed-in arguments

Stack

```
int bar(int x, int y)
{
    int n = x * y;
    return n;
}

int foo(int n)
{
    return bar(n, n + 2);
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int main(int argc, string argv[])
{
    printf("%i\n", foo(4));
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Bottom of the stack

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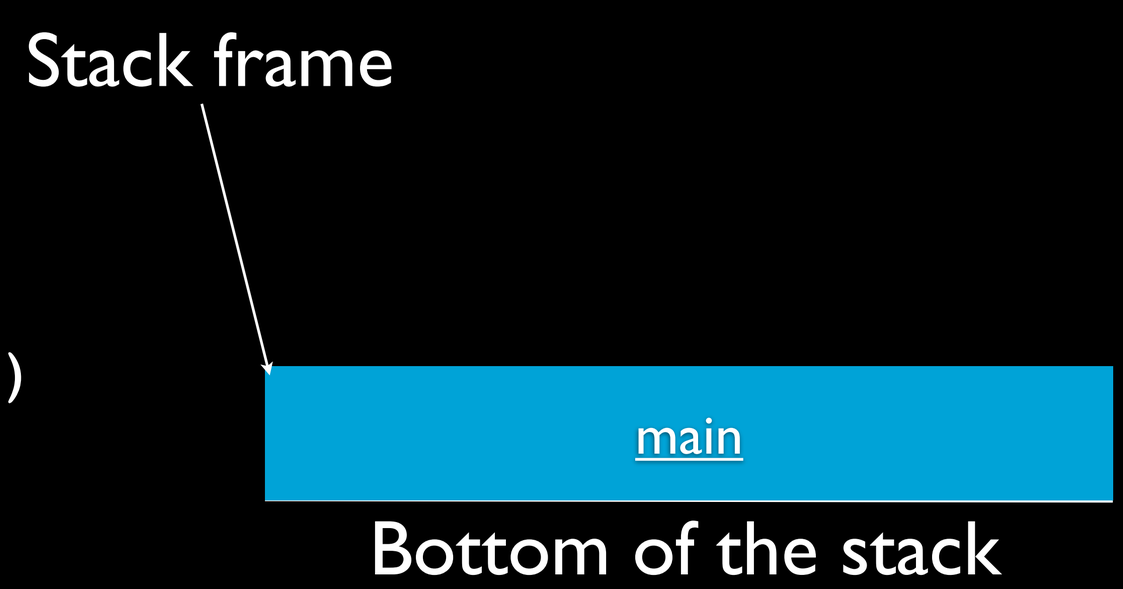

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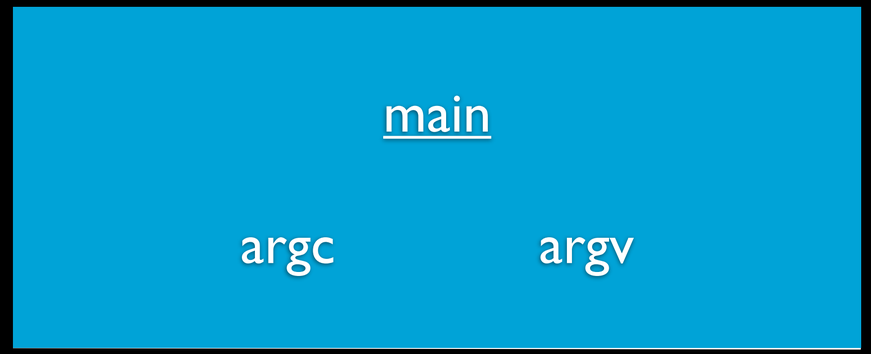

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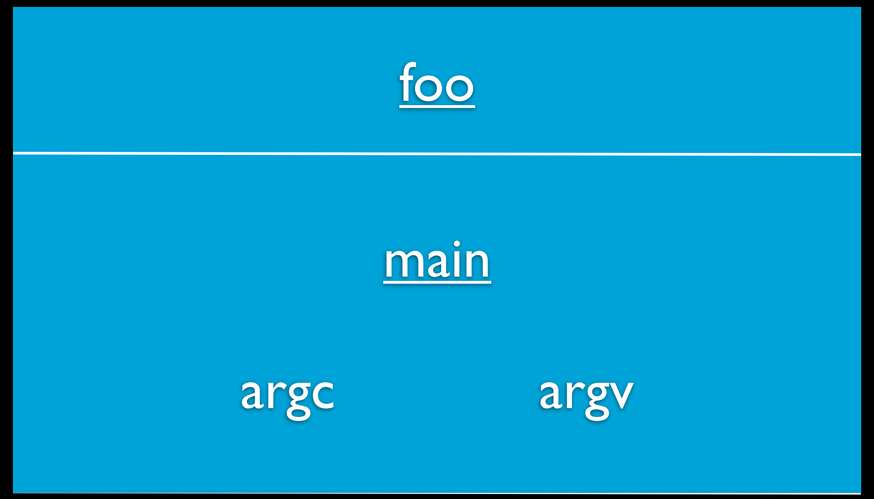

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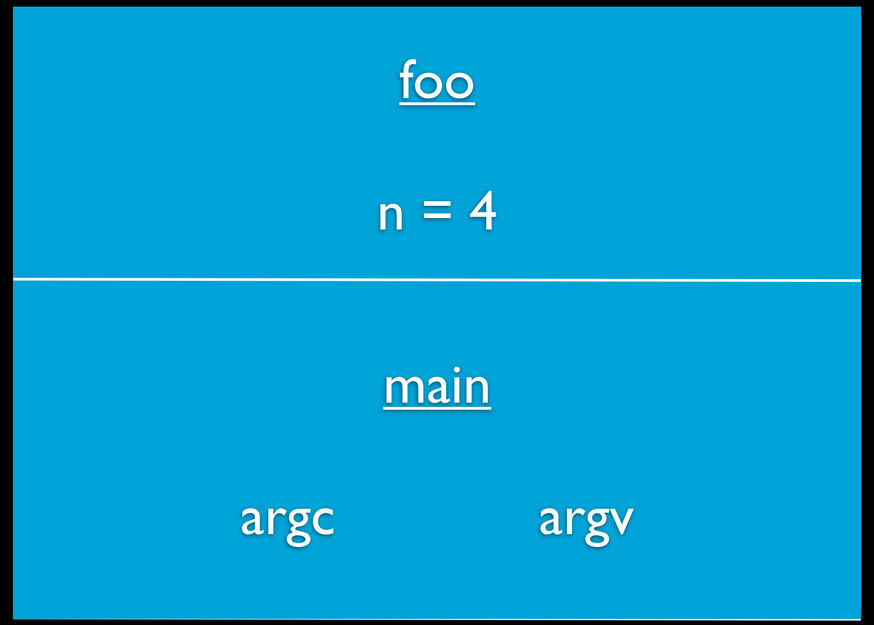

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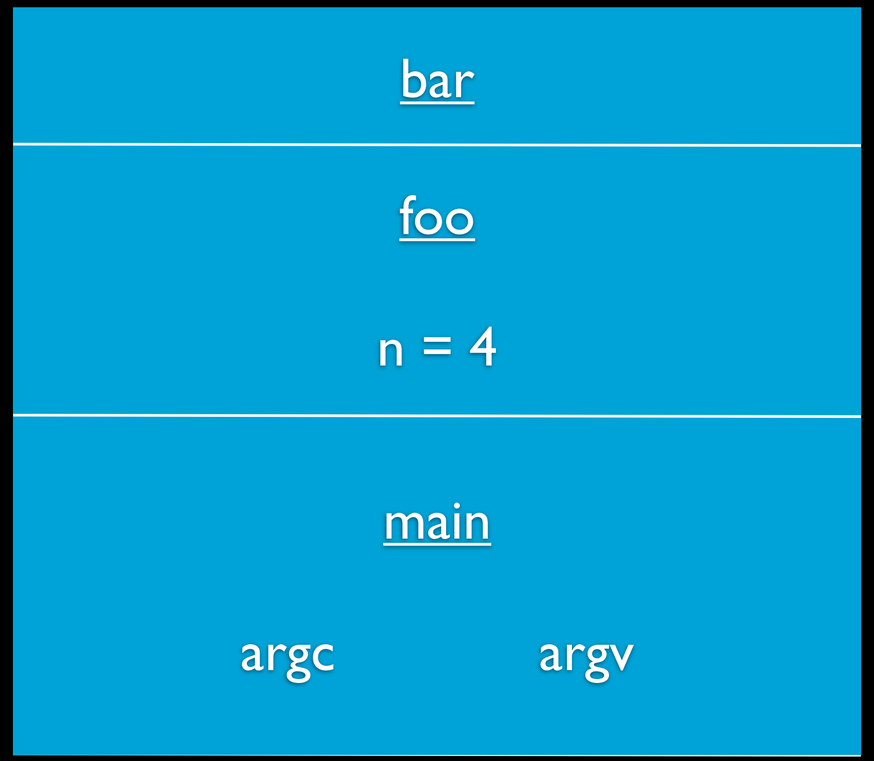

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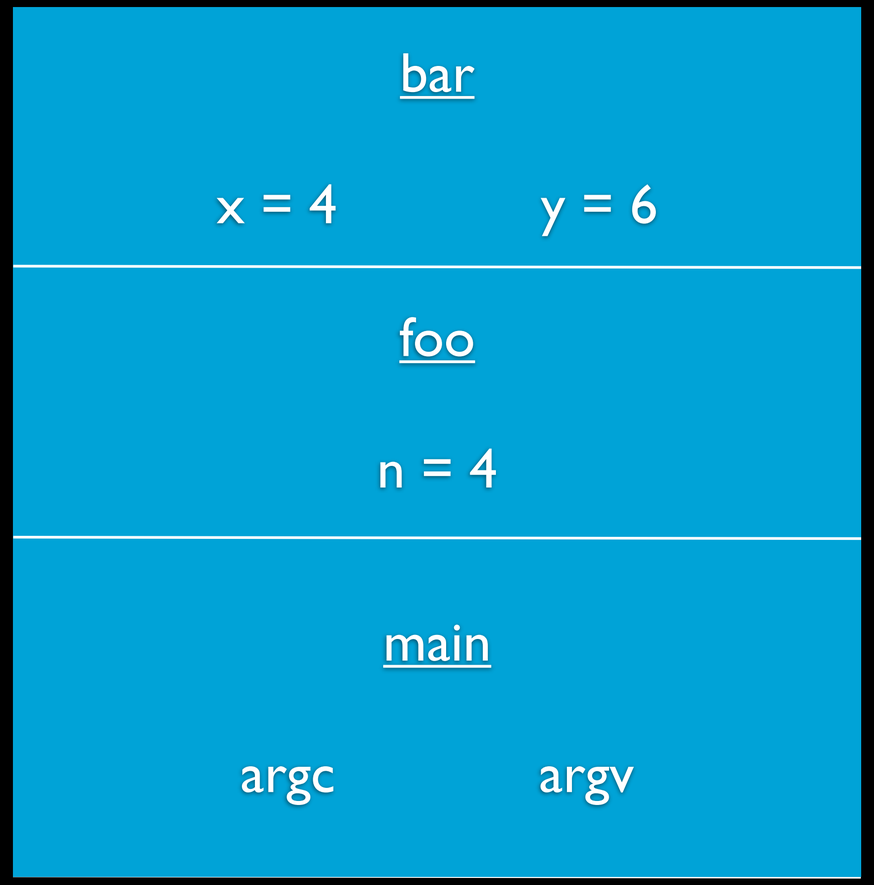

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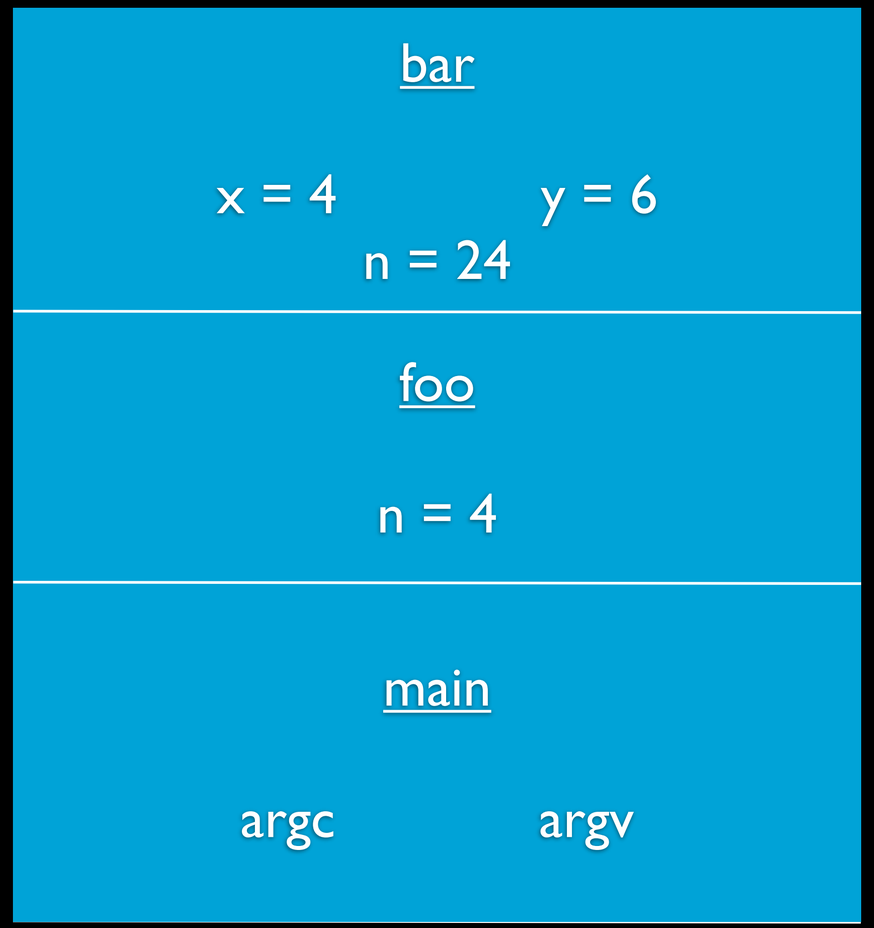

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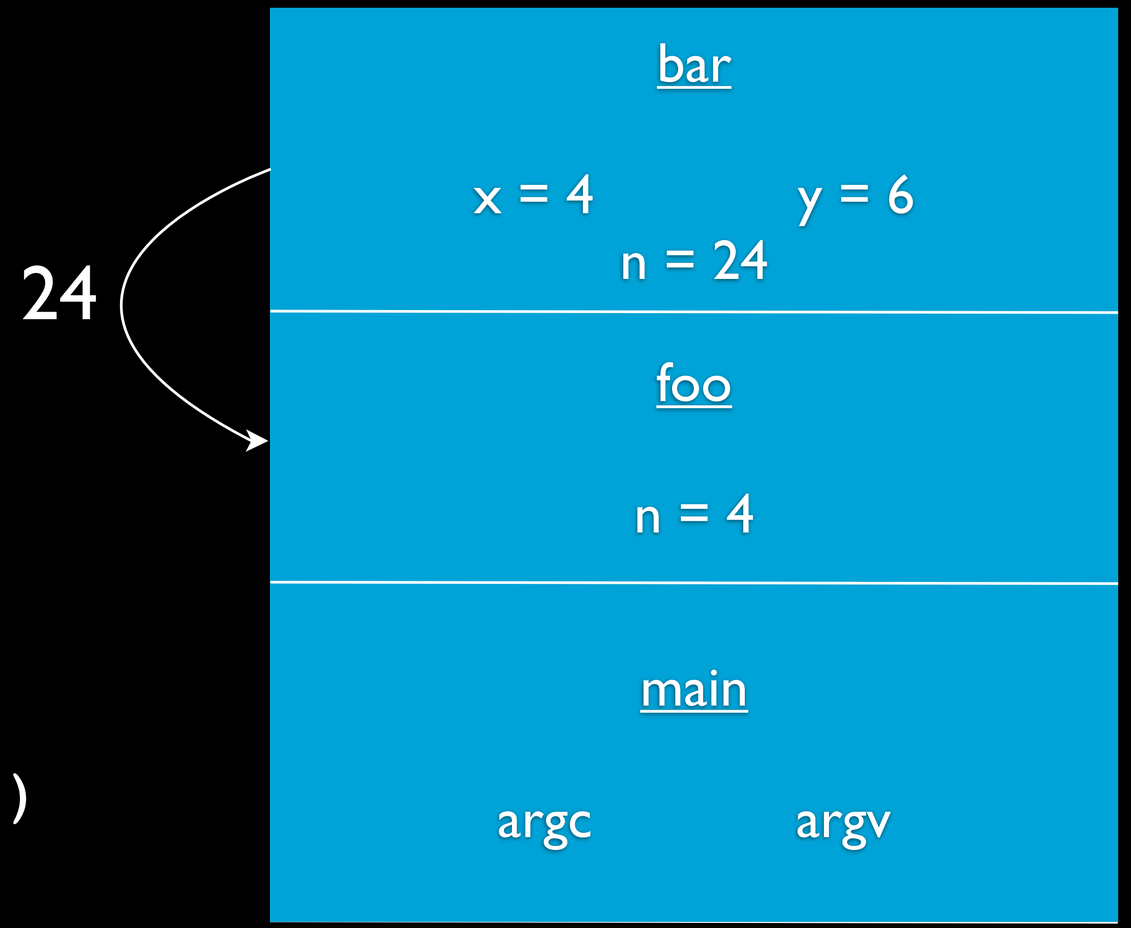

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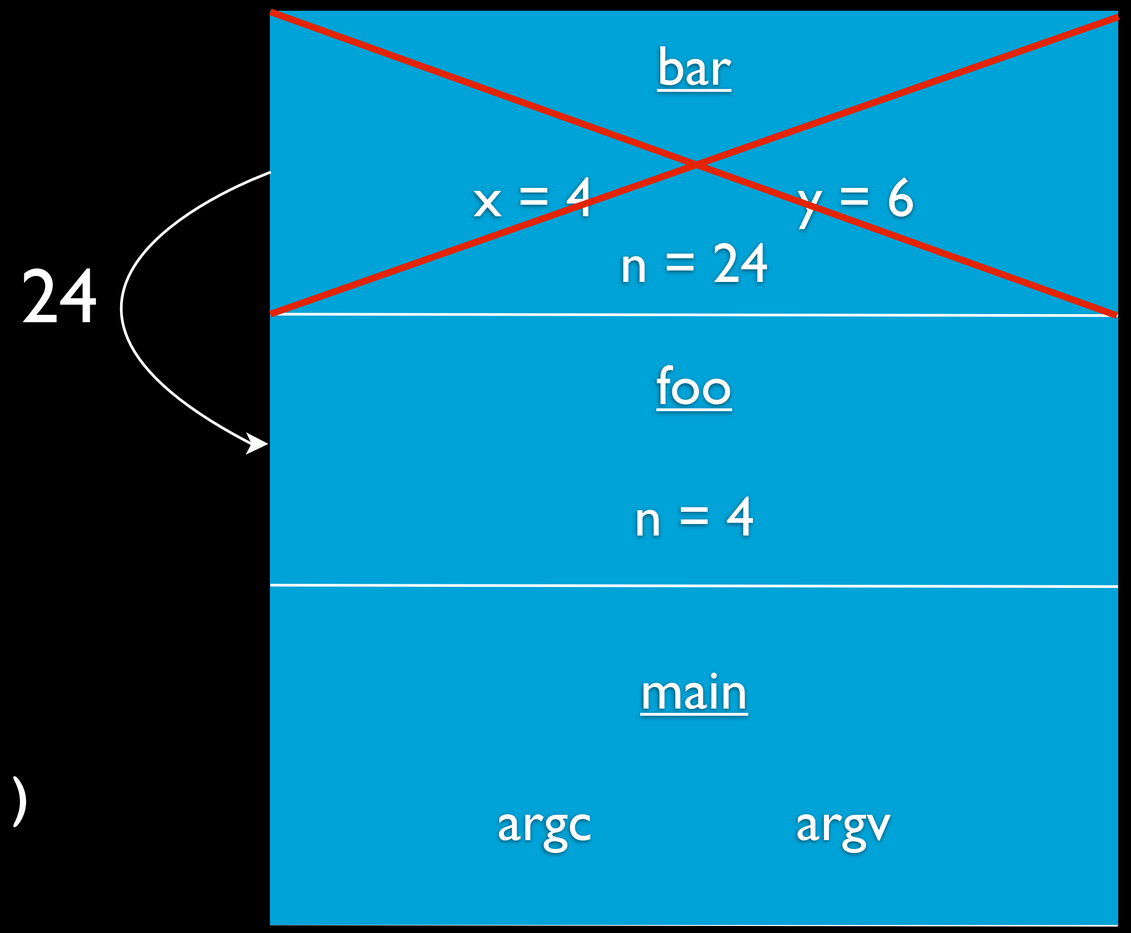

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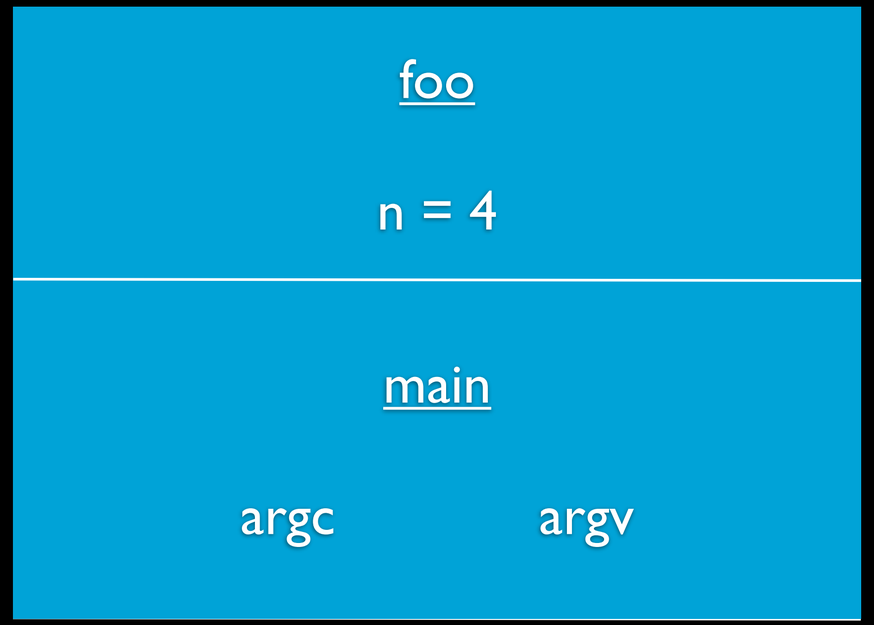

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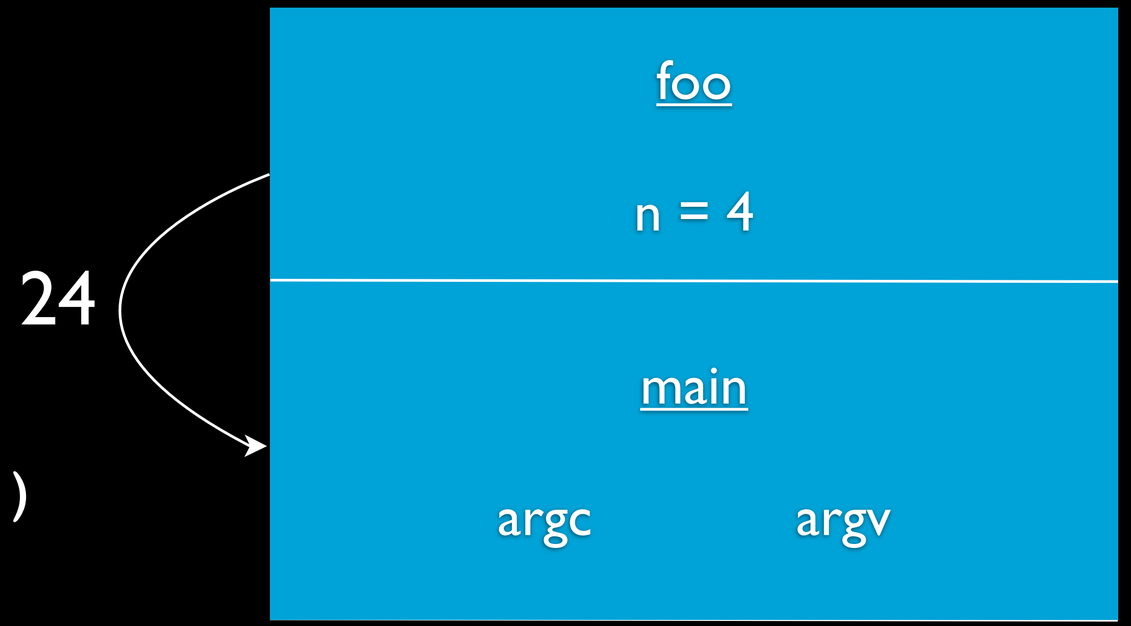

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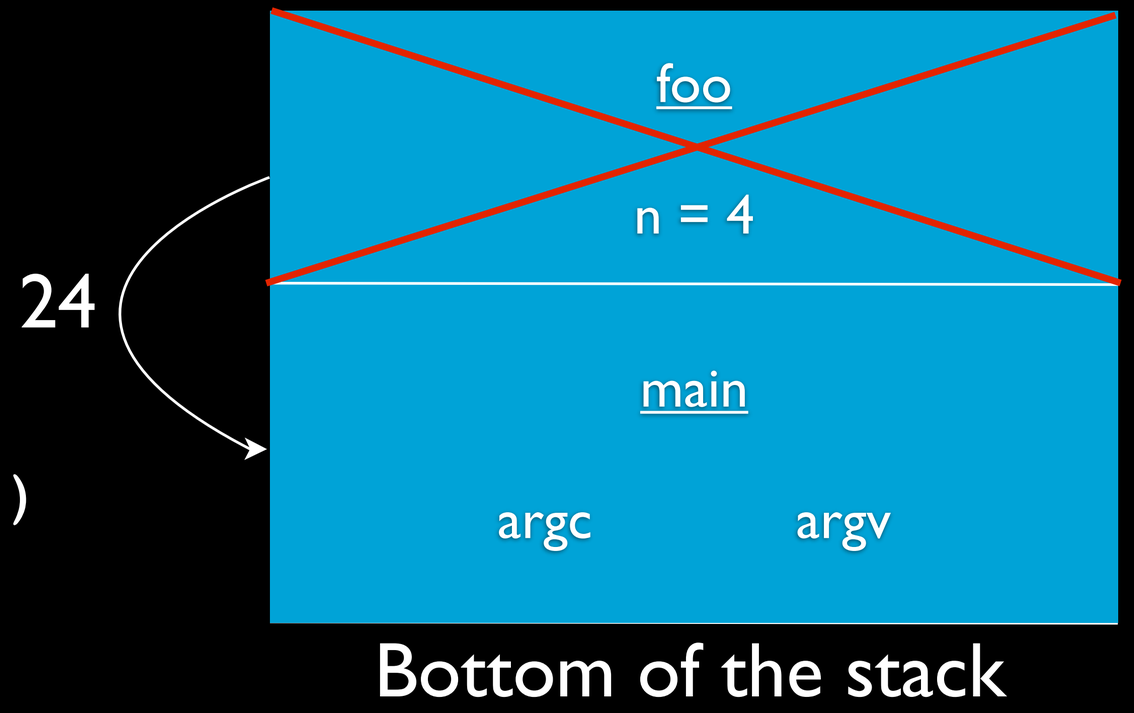

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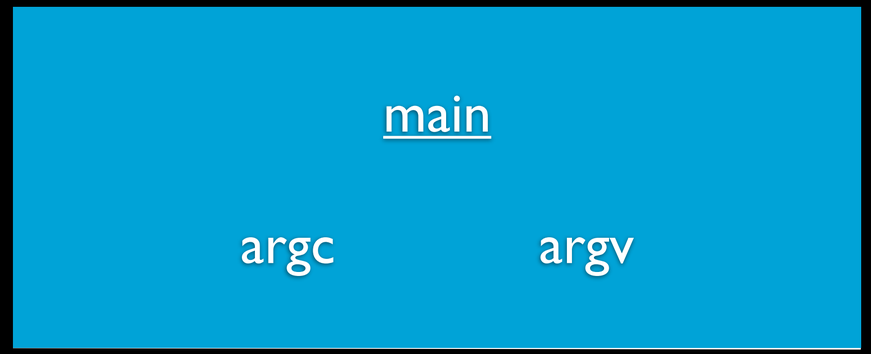

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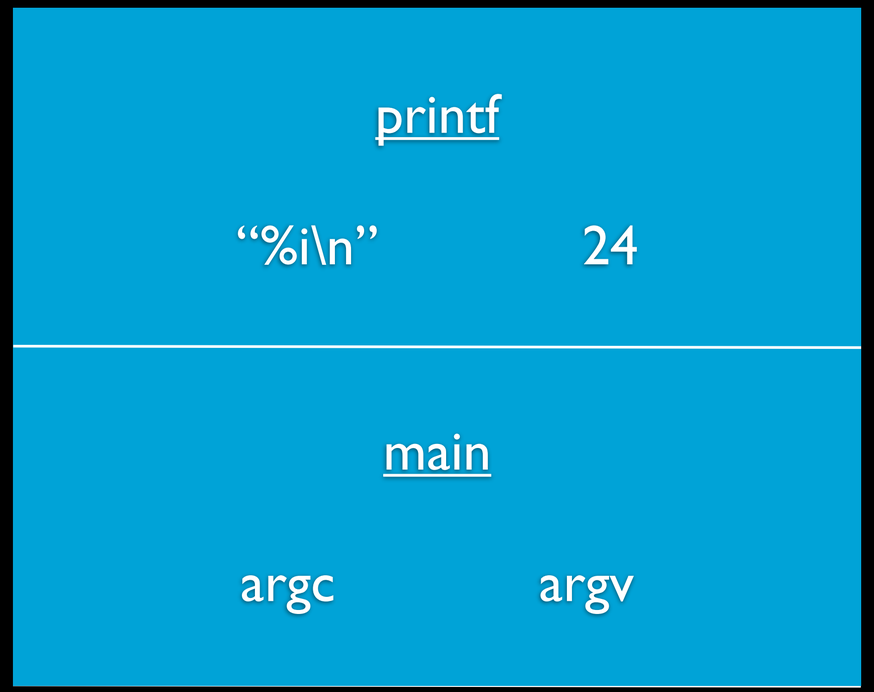

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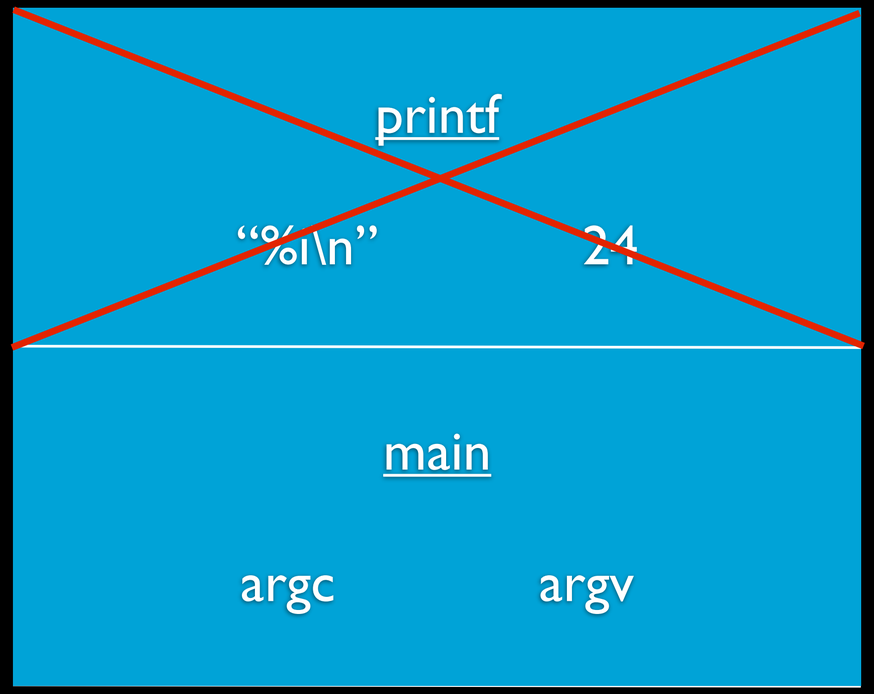

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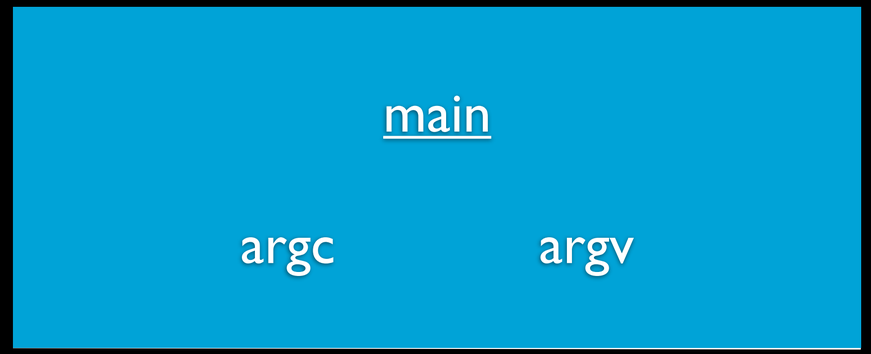

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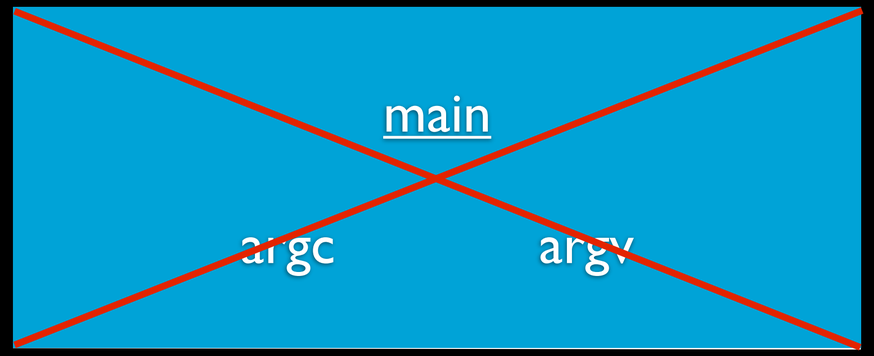

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```

Bottom of the stack

Heap

- Dynamic memory management
- malloc and free

Heap

```
int main(int argc, string argv[])
{
    int* x = malloc(sizeof(int));
    if (x == NULL)
    {
        return 1;
    }
    *x = 50;
    printf("%i\n", *x);
    printf("%p\n", x);
    free(x);
    return 0;
}
```

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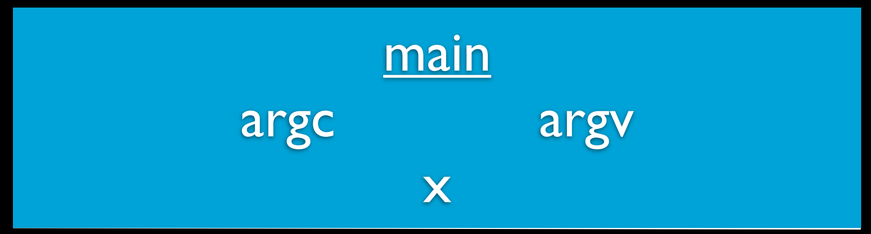
Top of the heap



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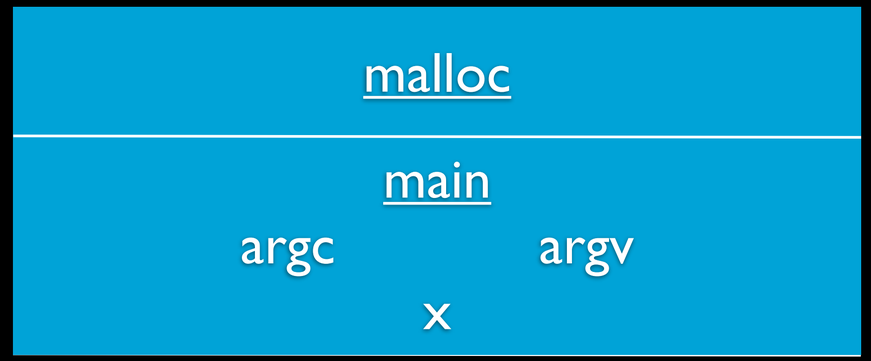

Bottom of the stack

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0x123

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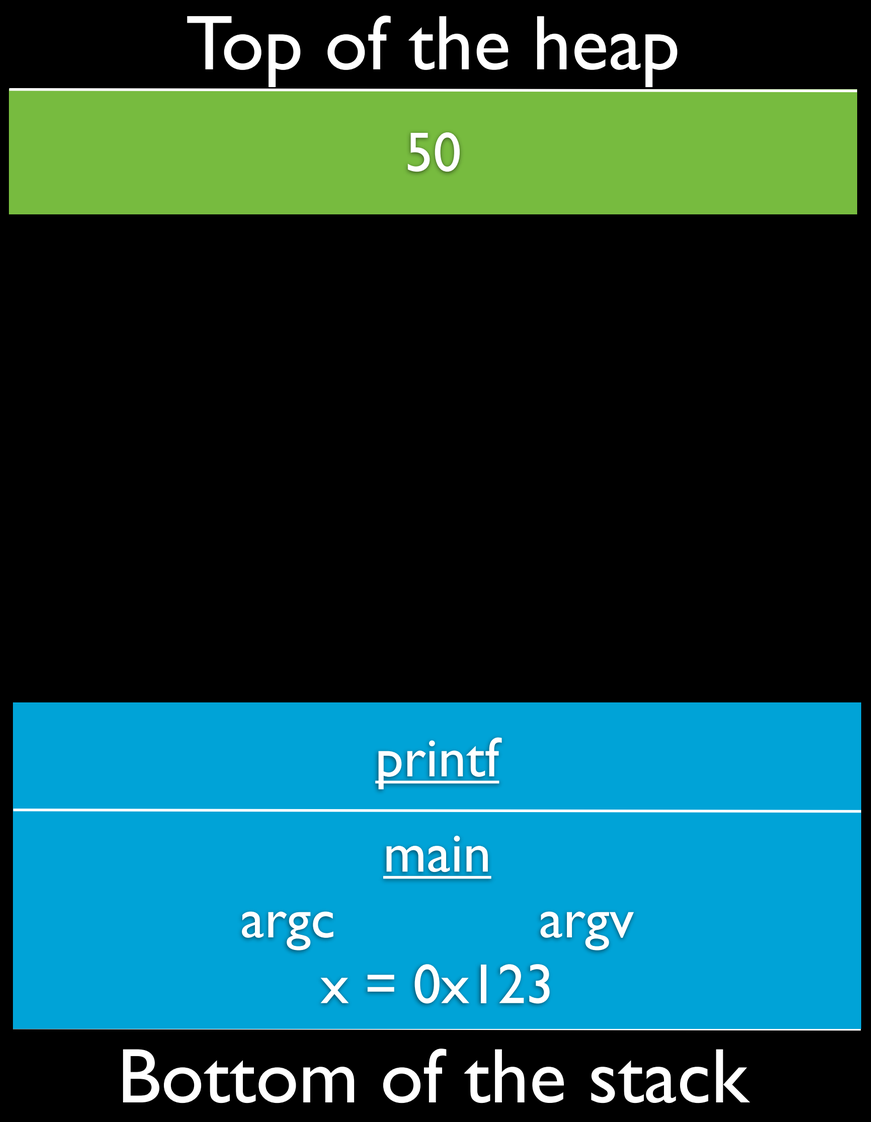

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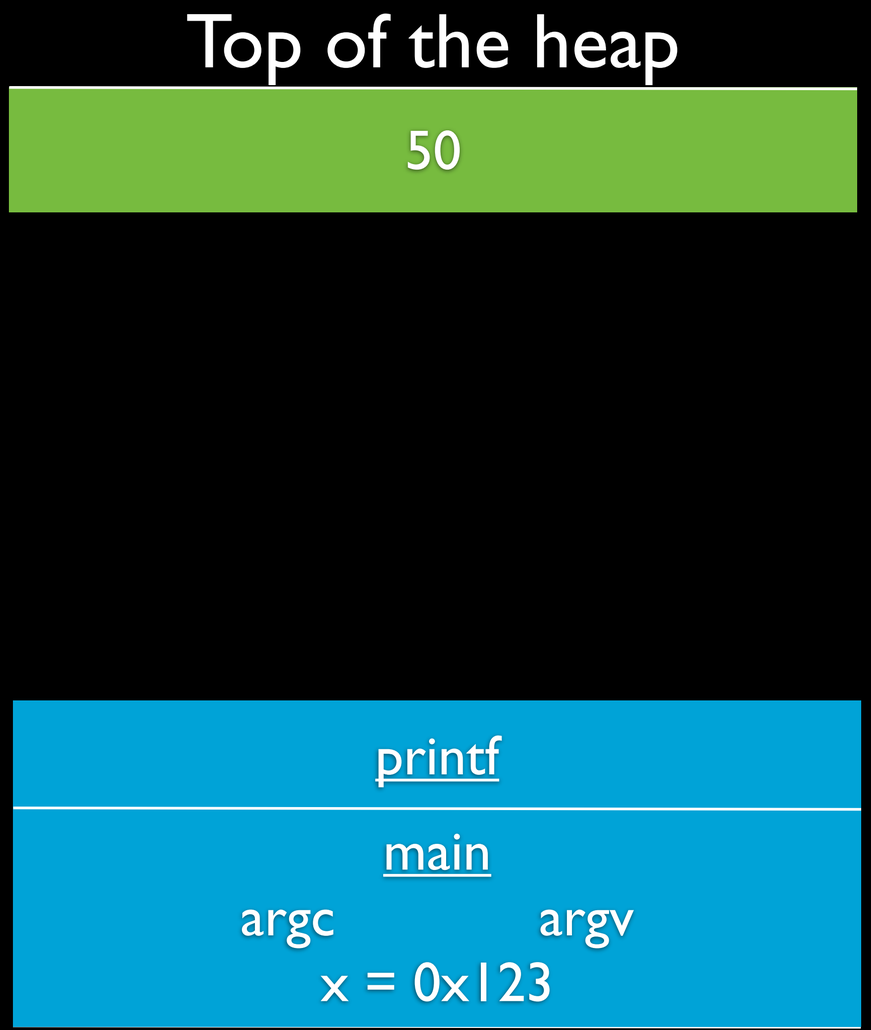

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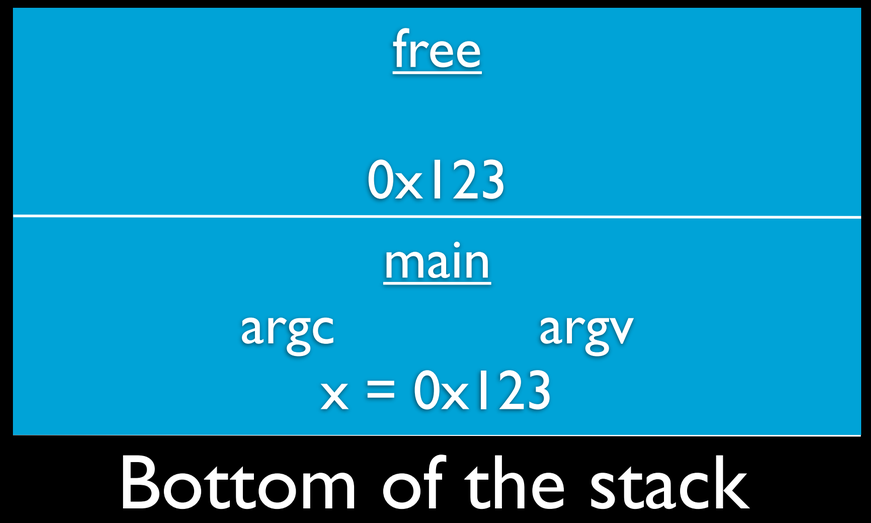

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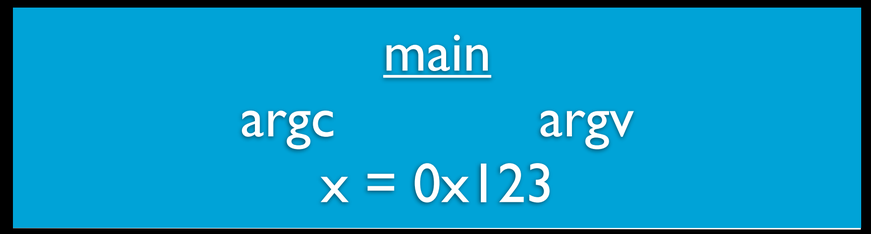
Top of the heap



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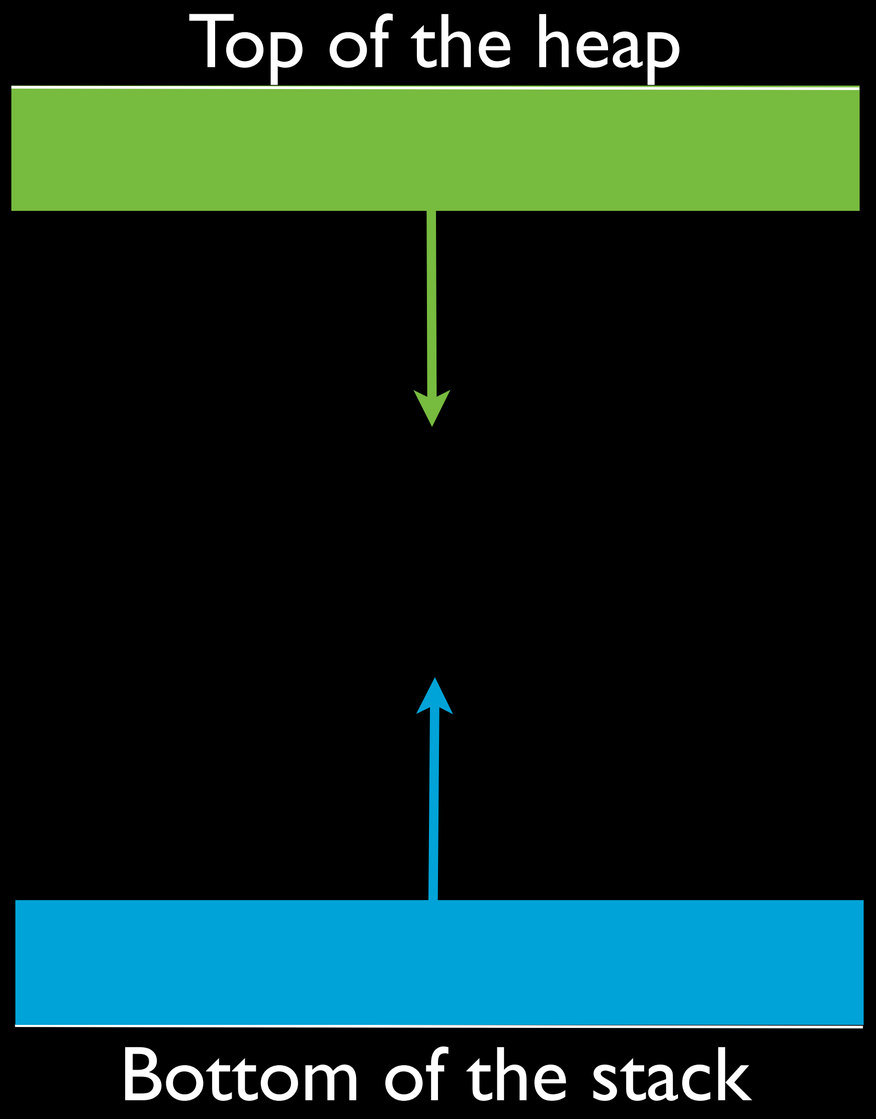
Top of the heap

Bottom of the stack

Stack overflow



Stack overflow

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void foo(void)
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int main(int argc, string argv[])
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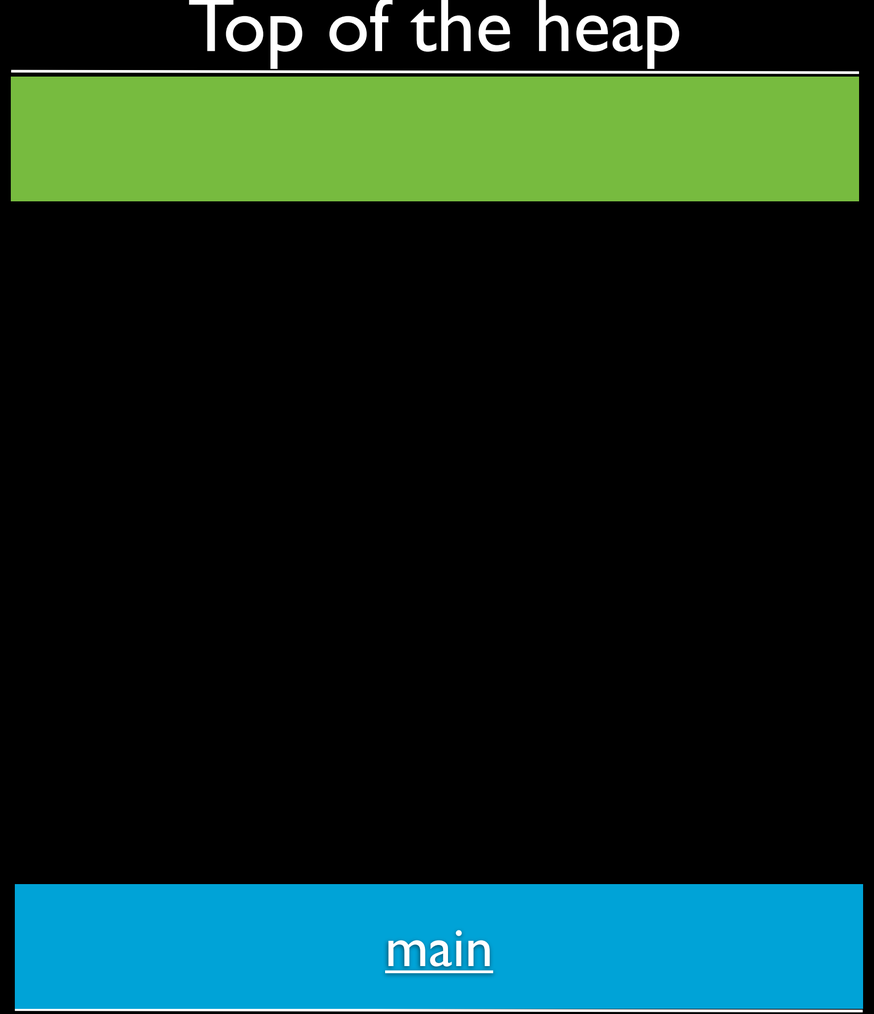

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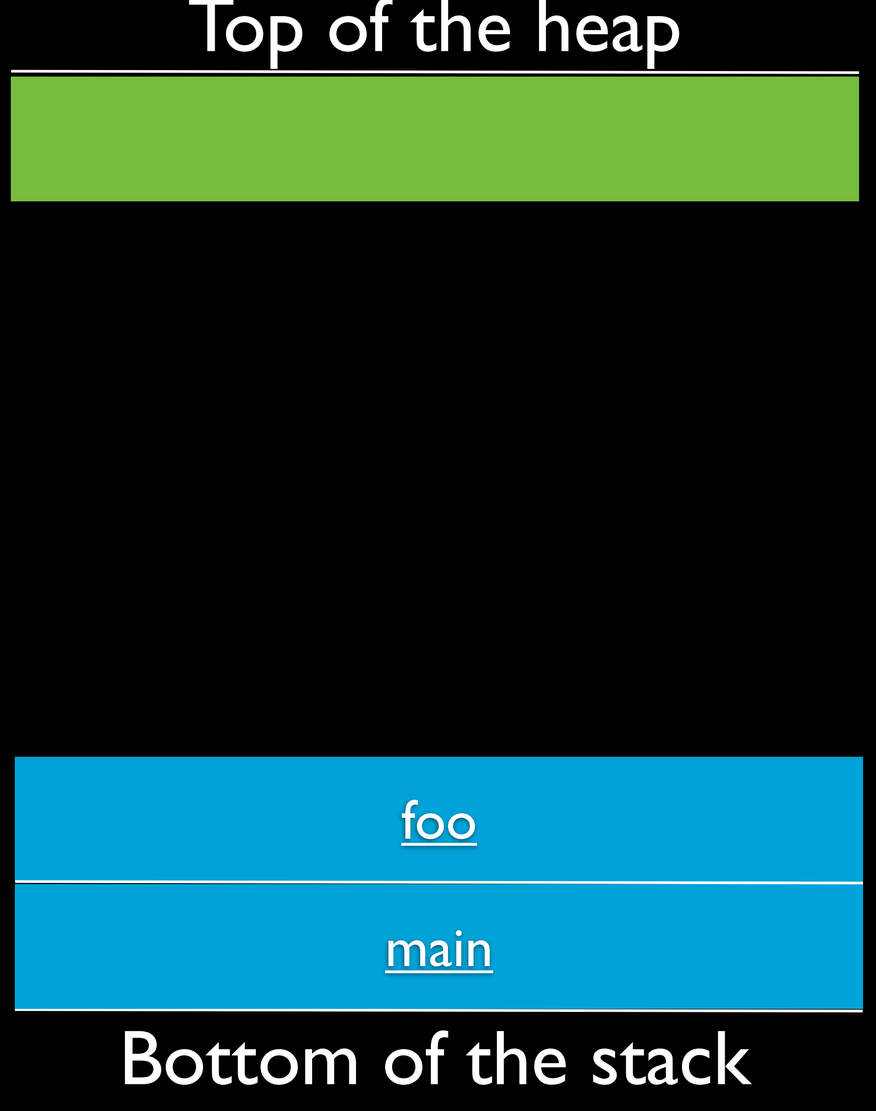

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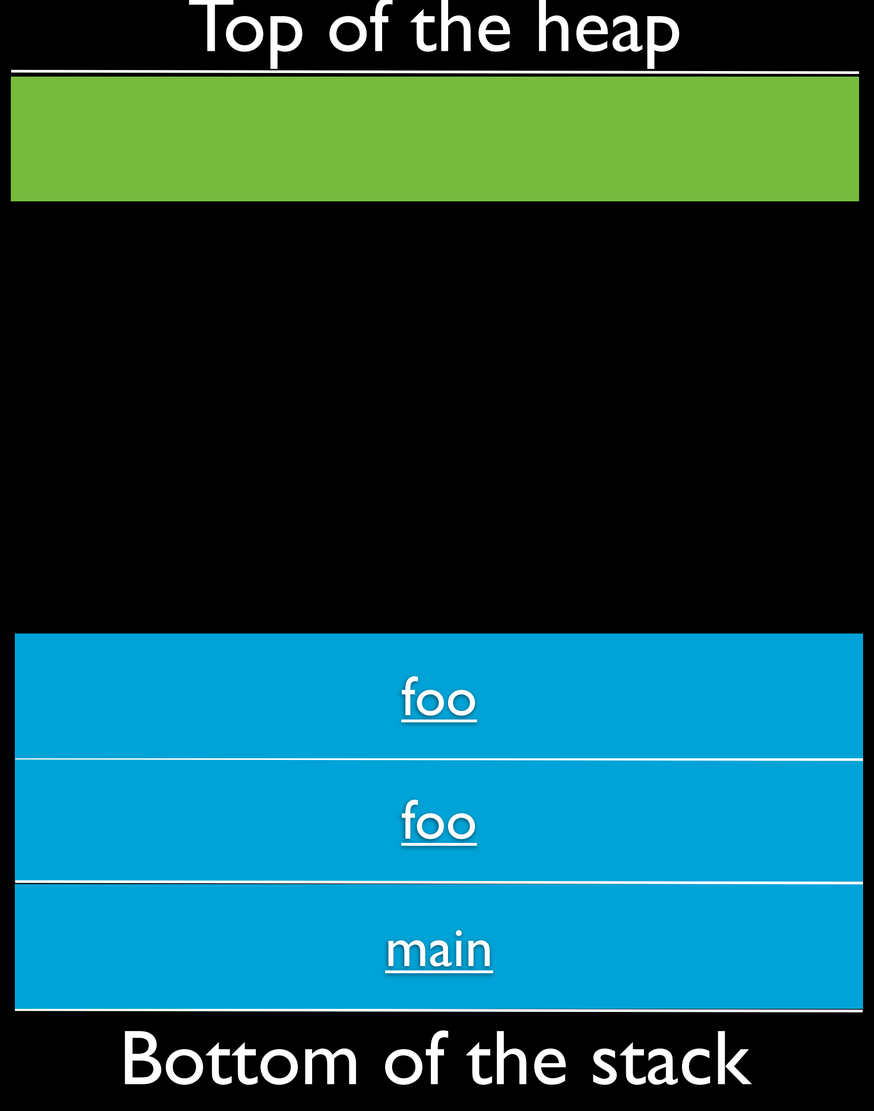

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Compilation

- Pre-processing (#)
- Compiling (C => Assembly)
- Assembling (Assembly => Binary)
- Linking (Binary => Executable <= Binary)