Debugging.TV

Frame 0x0E

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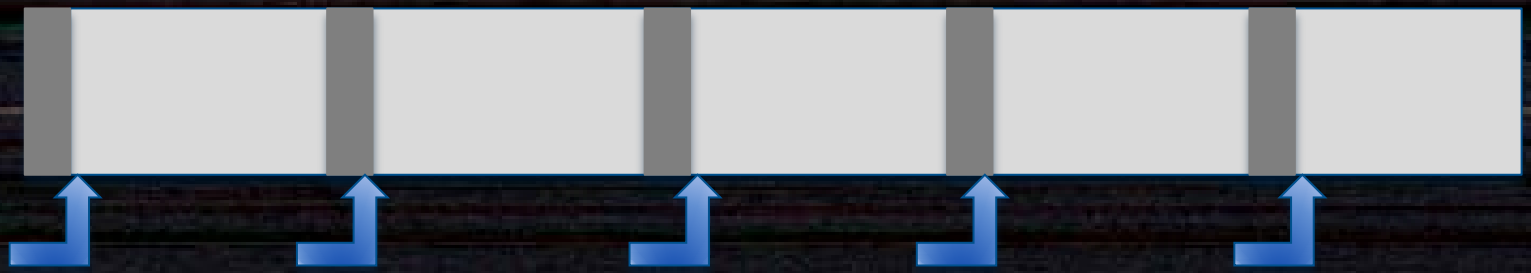
Topics

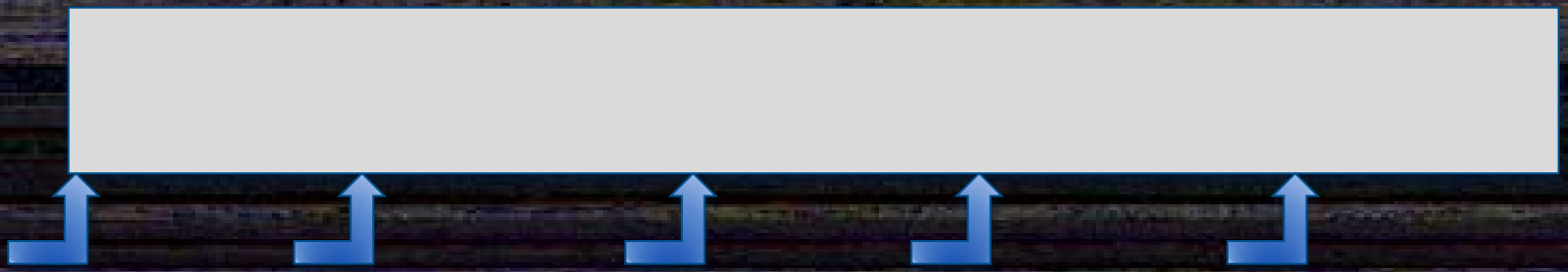
- Heap on Mac OS X vs. Windows
- Heap Corruption pattern
- Double Free pattern

Heap (allocated)

- Windows

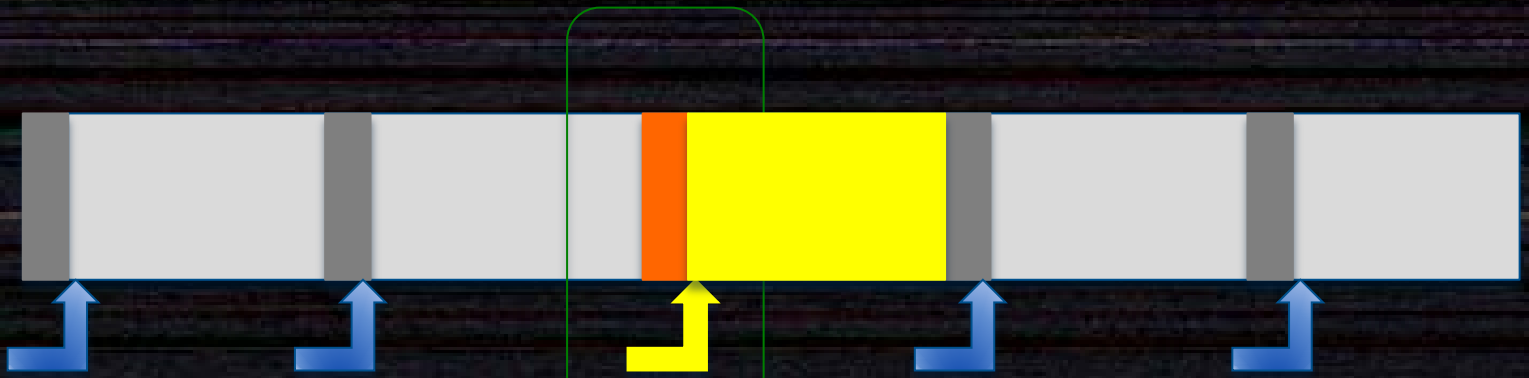


- Mac OS X

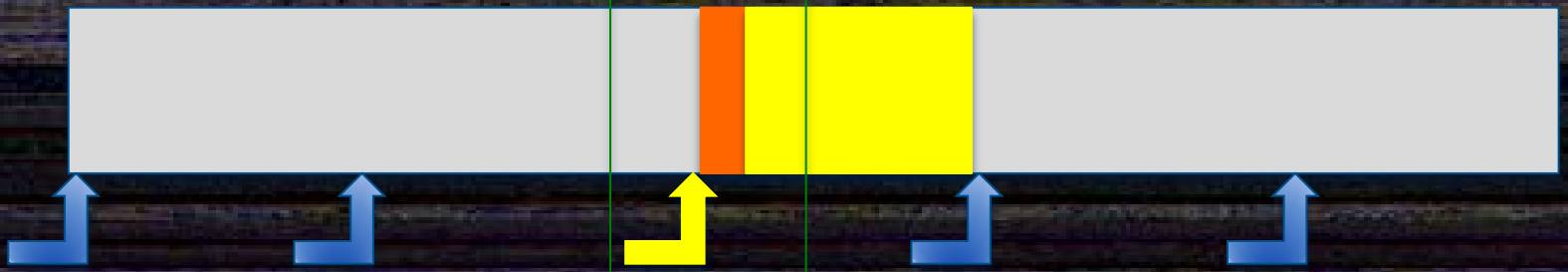


Heap (free)

- Windows



- Mac OS X



Heap Corruption

```
{
    free(p6);
    free(p4);
    free(p2);

    strcpy(p2, "Hello Crash!");
    strcpy(p4, "Hello Crash!");
    strcpy(p6, "Hello Crash!");

    p2 = (char *) malloc (512);
    printf("p2 = %p\n", p2);

    p4 = (char *) malloc (1024);
    printf("p4 = %p\n", p4);

    p6 = (char *) malloc (512);
    printf("p6 = %p\n", p6);

    free (p7);
    free (p6);
    free (p5);
}
```

```
DumpAnalysis$ …/HeapCorruption2/Build/Products/Debug/HeapCorruption2
…
p2 = 0x107000890
p4 = 0x7fd613801400
p6 = 0x107000a90
HeapCorruption2(477) malloc: *** error for object 0x7fd613802408: incorrect checksum for freed object - object was
probably modified after being freed.
…
```

GDB Output

```
(gdb) bt
#0  0x00007fff8479582a in __kill ()
#1  0x00007fff8e0e0a9c in abort ()
#2  0x00007fff8e1024ac in szone_error ()
#3  0x00007fff8e1024e8 in free_list_checksum_botch ()
#4  0x00007fff8e102a7b in small_free_list_remove_ptr ()
#5  0x00007fff8e106bf7 in szone_free_definite_size ()
#6  0x00007fff8e13f789 in free ()
#7  0x0000000106f21e23 in main (argc=1, argv=0x7fff66b20b08)

(gdb) frame 7
#7  0x0000000106f21e23 in main (argc=1, argv=0x7fff66b20b08)
    at …/HeapCorruption2/main.c:56
56            free (p5);

(gdb) x/2i 0x0000000106f21e23
0x106f21e23 <main+771>:     mov    -0x30(%rbp),%rdi
0x106f21e27 <main+775>:     callq  0x106f21e9a <dyld_stub_free>

(gdb) x/s 0x7fd613802408
0x7fd613802408:     "ash!"
```

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