

HW2.3. Memory Alpha Model

Consider the following code:

```
#define SPOCK 1701
int KIRK = 1701;
int sulu(int scotty) {
    return scotty * scotty;
}
int main(int argc, char *argv[]) {
    int *chekov = malloc(sizeof(int) * 1701);
    if (chekov) free(chekov);
    sulu(SPOCK); // ← snapshot just before it returns
    return 0;
}
```

For each of the following symbols, choose what section of memory it would live in.

Q1.1: **sulu**

- ☐ (a) stack
- ☐ (b) heap
- ☐ (c) static/data
- ☒ (d) code ✓

✓ 100%

Q1.2: **chekov**

- ☒ (a) stack ✓
- ☐ (b) heap
- ☐ (c) static/data
- ☐ (d) code

✓ 100%

Q1.3: ***chekov**

- ☐ (a) stack
- ☒ (b) heap ✓
- ☐ (c) static/data
- ☐ (d) code

✓ 100%

Q1.4: **KIRK**

- ☐ (a) stack
- ☐ (b) heap
- ☒ (c) static/data ✓
- ☐ (d) code

✓ 100%

Q1.5: **scotty**

- ☒ (a) stack ✓
- ☐ (b) heap
- ☐ (c) static/data
- ☐ (d) code

✓ 100%

Q1.6: On the line **sulu(SPOCK)** ;, where is **SPOCK** located?

- ☐ (a) stack
- ☐ (b) heap
- ☐ (c) static/data
- ☒ (d) code ✓

Homework 2

Assessment overview

Total points:	15/100
Score:	<div><div></div>15%</div>

Question

Value: 5

History: 5

Awarded points: 5/5

Report an error in this question

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✓ 100%

Try a new variant

Correct answer

Q1.1: `suLu`

(d) code

Q1.2: `chekov`

(a) stack

Q1.3: `*chekov`

(b) heap

Q1.4: `KIRK`

(c) static/data

Q1.5: `scotty`

(a) stack

Q1.6: On the line `suLu(SPOCK);`, where is `SPOCK` located?

(d) code

Q1.1: `suLu` is a function, and therefore it is stored in the code.

Q1.2: The variable `chekov` itself is stored in the stack, since it's a local variable. Note that the value of `chekov` is a pointer elsewhere.

Q1.3: Since we set `chekov` to a pointer returned by `malloc`, `*chekov` is located on the heap.

Q1.4: `KIRK` is declared outside any function and is a variable, so it gets stored in the static/data segment.

Q1.5: `scotty` is a local variable (as a function argument) to the function `suLu`, so it gets stored on the stack. Note that the value of `SPOCK` gets copied into a new local variable, since C is pass-by-value.

Q1.6: `SPOCK` is defined by a `#define` statement. Effectively, all instances of `SPOCK` get replaced with `1701` by the compiler before it continues to compile the code. As such, the value of `SPOCK` gets copied directly into the code.

Submitted answer 2 **correct: 100%**

Submitted at 2022-09-03 08:27:00 (PDT)



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Q1.1: `suLu`

(d) code ✓ 100%

Q1.2: `chekov`

(a) stack ✓ 100%

Q1.3: `*chekov`

(b) heap ✓ 100%

Q1.4: `KIRK`

(c) static/data ✓ 100%

Q1.5: `scotty`

(a) stack ✓ 100%

Q1.6: On the line `suLu(SPOCK);`, where is `SPOCK` located?

(d) code ✓ 100%

Submitted answer 1 **partially correct: 50%**

Submitted at 2022-09-03 08:26:33 (PDT)



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