Lecture 14:
Memory Allocation Implementation

CSE 29: Systems Programming and Software Tools

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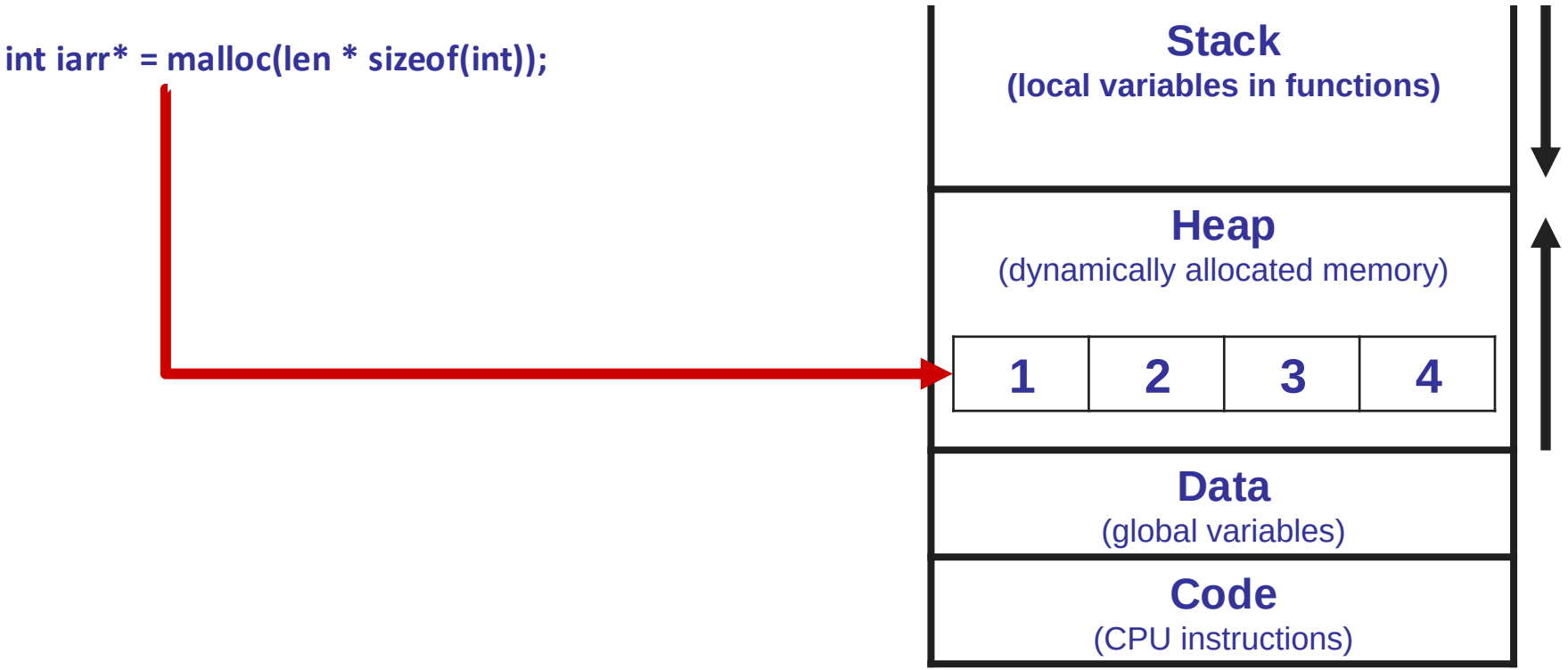
Logistics

- Test 2 this week
- Project 3 released this week
- Project 1 resubmit due today

What does malloc() do?



Malloc APIs

Malloc – allocate memory on the heap

```
int* pa = malloc(10 * sizeof(int));
```

Free – free the allocated memory

```
free(pa);
```

Calloc – Similar to malloc but zeros out allocated memory

```
int *pa = calloc(sizeof(int), 10);
```

Realloc – Increase or decrease size of an allocation

Will grow or shrink the heap allocation or copy the data to a new allocation *if needed*

```
pa = realloc(pa, 20* sizeof(int));
```

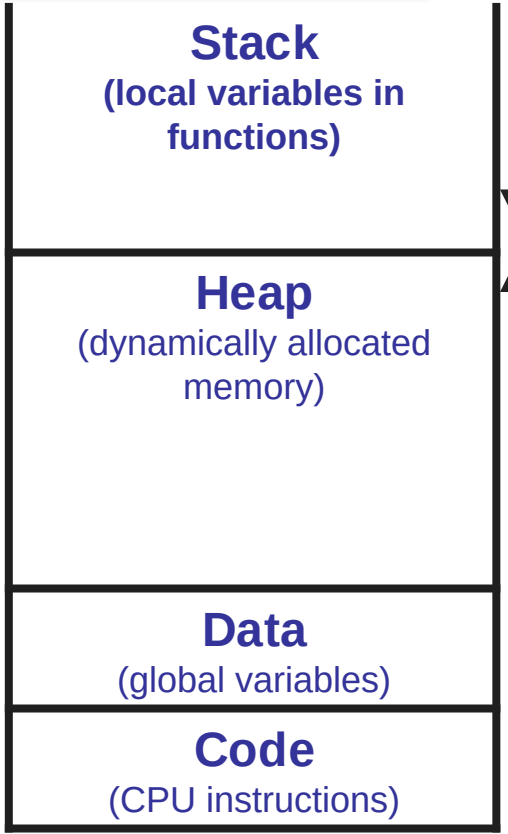
Malloc APIs (no longer used but interesting)

Brk – change what address the heap ends and the stack starts

```
int* pa = brk(0x13000000);
```

0x13000000

Essentially, sets the size of the heap



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Brk – change what address the heap ends and the stack starts

```
int* pa = brk(0x13000000);
```

0x13000000

Essentially, sets the size of the heap

SBrk – increase the size of the heap by the specified size

```
int* newheapend = sbrk(100);
```