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Memory in C

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- Malloc, how we request memory from the operating system
- Static vs Dynamic Memory, and why you would use one over the other

Segmentation of Memory

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- Programs are not allowed to touch memory outside of what has been allocated by the operating system. If they do a segmentation fault occurs.

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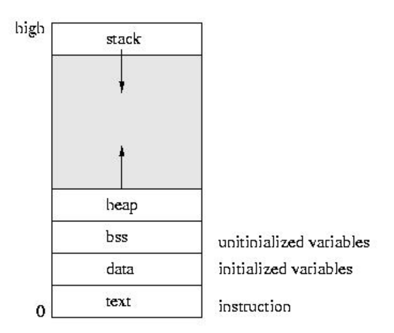
- 

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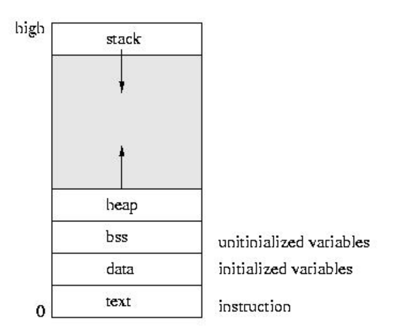
- 

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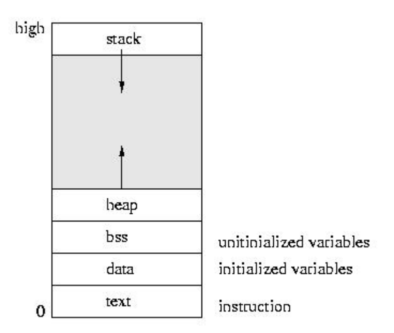
- 

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  will return a pointer to 5 bytes on the heap.
- We can use the memory given by malloc to store data on the heap.

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- The most challenging, and useful thing about C is that you have the ability to fully control memory.
- You also have the option of letting the compiler control it for you.
- These two dynamics exposed in C are called Static and Dynamic Memory.

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- When you are declaring variables, arrays, and structs, these data items are stored on the Stack.
- The memory is allocated for them by the compiler when they come into scope, and it is deallocated when they fall out of scope.
- These variables would be statically allocated on the stack

```
int i = 0;
int arr[10];
```

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- Dynamic memory is powerful because it allows you to utilize memory programmatically.
- You can create data structures that grow and shrink in response to different situations in your program.
- It is one of the features that allows C to outperform other higher level languages. Greater control means greater optimization opportunities.

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- Dynamic memory is complicated. There is a lot of opportunities to make mistakes.
- Dynamic memory is flexible. We can adjust the amount of memory allocated to a structure on the fly.
- Dynamic memory also allows us to be far more efficient then higher level languages.

Thanks For Watching

Hopefully you've gained a high level overview of the memory structure of a C program and are prepared to go more in depth into memory and pointers.