

Homework 1

1)

Static Memory Allocation: The allocation of memory at compile time before the program is ran.

- Variables are stored on the stack.
- Allocated when a program starts.
- Fixed size.
- Has a local scope.
- Memory managed by the kernel.
- All variables are freed on program exit.
- Size is limited on the stack
- E.G. global variables, static variables, and arrays

Dynamic Memory Allocation: The allocation of memory at run time while the program is ran.

- Variables are stored on the heap.
- Allocated on demand during program.
- Mutable size.
- Has a global scope.
- Memory managed by the programmer.
- All variables are NOT freed on program exit. Memory must be freed manually.
- Size is not limited on the heap.
- E.G. linked lists and variables created with malloc()

2)

`int myInt, *myPointerToInt` : Declares an integer `myInt` and an integer pointer `myPointerToInt`.

`myInt = Unknown`

`myPointerToInt = Unknown`

`myPointerToInt = &myInt` : Points `myPointerToInt` to the address at `myInt`.

`myInt = Unknown`

`myPointerToInt = Address of myInt`. In my case 0.

`*myPointerToInt = 0` : Sets the value at the address of `myPointerToInt` to 0.

`myInt = 0`

`myPointerToInt = 0`

`printf("myInt is %d\n", myInt)`

`myInt = 0`

`myPointerToInt = 0`

`printf("*myPointerToInt is %d\n", *myPointerToInt)`

`myInt = 0`

`myPointerToInt = 0`

`*myPointerToInt += 1` : Increments the value at the address of `myPointerToInt` by 1.

`myInt = 1`

`myPointerToInt = 0`

`printf("myInt is %d\n", myInt)`

`myInt = 1`

`myPointerToInt = 0`

`(*myPointerToInt)++` : Increments the value at the address of `myPointerToInt` by 1 again.

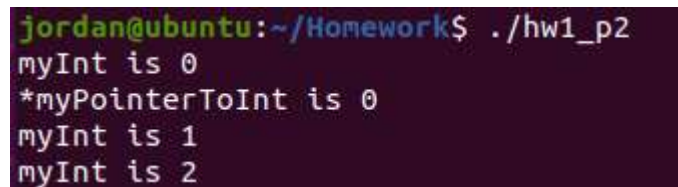
`myInt = 2`

`myPointerToInt = 0`

`printf("myInt is %d\n", myInt)`

`myInt = 2`

`myPointerToInt = 0`



```
jordan@ubuntu:~/Homework$ ./hw1_p2
myInt is 0
*myPointerToInt is 0
myInt is 1
myInt is 2
```

3)

Ubuntu 64-bit w/ kernel version 5.4.0-47-generic.

Linux distribution virtualized in VMware Workstation 15 Player using .iso file downloaded from the official Ubuntu website.

```
jordan@ubuntu:~/Homework/HW1$ gcc --version
gcc (Ubuntu 9.3.0-10ubuntu2) 9.3.0
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```