

CSC 369 Worksheet 6 Solution

August 20, 2020

1. Done. See link here
2. First, I need to find out how much memory is in my system, and how much is free.
Running the command `free -m`, we have

```
ubuntu@primary:~$ free -m
              total        used        free      shared  buff/cache   available
Mem:           981         157          131           0         691         668
Swap:              0              0              0
```

Using this information, I can write that the computer has

- 981 MB of total memory
- 131 MB of free memory

Second, I need to answer if these numbers match my intuition.

It does match my intuition that free memory should be less than total memory.

Notes

- I should ask professor the type of intuition the author was expecting
 - Installing Ubuntu Virtual Machine link: [here](#)
 - Start virtual machine by typing command: `multipass start ubuntu-lts`
3. I need to write a little program `question_3.c` (I will create this instead of `memory-user.c` for recording keeping purposes) that uses a certain amount of memory.

It's criteria are:

- The program should take one command-line argument: the number of megabytes of memory it will use.
- The program should allocate an array.
- The program should constantly stream through the array, touching each entry.
- The program should do this indefinitely, or for a certain amount of time also specified in command line.

For it's solution, please refer to `question_3.c`

Notes

- Learned that a large array (> 5000) can be generated using heap memory ^[1]
- **Command Line Arguments in C**

```
#include <stdio.h>

int main (int argc, char *argv[])
{
    return 0;
}
```

- `argc`
 - * Is the number of arguments passed to the program
- `argv`
 - * Is an array of strings
 - * Each string represents one of the arguments passed to the program

Example

For example, the command line

```
gcc -o myprog myprog.c
```

would result in the following values internal to GCC:

```
argc
    4
argv[0]
    gcc
argv[1]
    -o
argv[2]
    myprog
argv[3]
    myprog.c
```

- **String to integer**

- **Syntax:** `int atoi(const char *string)`

Example

```
int output = atoi("20") /* Stores 20 in output*/
```

References

- 1) Stackoverflow, Allocating A Large (5000+) Array, [link](#)
- 2) Techdelight.com. Hpw tp fomd execution time of a C program, [link](#)
- 3) Stackoverflow, How do you clear the console screen in C, [link](#)
4. First, I need to revise program made in question 3 to also run the free tool.

For it's solution, please refrer to `question_4.c`.

Notes

- Mac's equivalent of Ubuntu's `free -m` is `sysctl vm.swapusage` ^[1]

References

- 1) Stack Overflow, Is there a Mac OS X Terminal version of the “free” command in Linux systems? ,[link](#)