Question 1: C memory structure

objdump - display information from object files. Used command: objdump -t /-d a.out

nm - list symbols from object files. Used command: nm a.out

size - list section sizes and total size. Used command: size -A a.out

1. char globBuf[65536]; /\* 1. global variable, stored on the heap (uninitialized data section - BSS ) \*/

objdump- 0000000000404080 **g** O **.bss** 0000000000010000 globBuf

nm- 0000000000404080 **B** globBuf

1. int primes[] = { 2, 3, 5, 7 }; /\* 2. global variable, stored on the heap (initialized data section) \*/

objdump- 0000000000404040 **g**  O **.data** 0000000000000010 primes

nm- 0000000000404040 **D** primes

1. square(int x) /\* 3. function declaration - stored in the text section \*/

objdump- 0000000000401136 **l** F **.text**  0000000000000015 square

nm- 0000000000401136 **t** square

1. int result; /\* 4. stored in the function stack \*/

nm where result is declared -0000000000401136 **0000000000000015** t square

nm after result was commented out -0000000000401136 **000000000000000e** t square

1. return result; /\* 5. passed using the eax register\*/ used

401140: 0f af c0 imul %eax,%eax

401143: 89 45 fc mov %eax,-0x4(%rbp)

401146: 8b 45 fc mov -0x4(%rbp),%**eax**

1. doCalc(int val) /\* 6. function declaration - stored in the text section \*/

objdump- 000000000040114b **l** F **.text** 000000000000005d doCalc

nm- 000000000040114b **t** doCalc

1. int t; /\* 7. stored in the function stack \*/

nm where t is declared- **0000000000000065** t doCalc

nm after t was commented out-**0000000000000050** t doCalc

1. main(int argc, char\* argv[]) /\* 8. function declaration - stored in the text section \*/

objdump- 00000000004011a8 **g** F **.text**  0000000000000026 main

nm- 00000000004011a8 **T** main

1. static int key = 9973; /\* 9. local variable, stored on the stack \*/

objdump- 0000000000404050 **l** O **.data**  0000000000000004 key.1

nm- 0000000000404050 **d** key.1

1. static char mbuf[10240000]; /\* 10. local variable, stored on the stack \*/

objdump- 0000000000414080 **l**  O .**bss** 00000000009c4000 mbuf.0

nm- 0000000000414080 **b** mbuf.0

1. char\* p; /\* 11. not allocated because its not initialized & not used \*/

nm when not initialized - **0000000000000036** T main

nm when initialized (char\* p = mbuf;) - **0000000000000044** T main