

```

1 // Example demonstrating memory address assignments
2 // George F. Riley, Georgia Tech, Fall 2009
3
4 int g1; // Global variable 1
5 int g2; // Global variable 2
6
7 int sub1()
8 { // First subroutine
9     int s1l1; // Sub1, local variable 1
10    int s1l2; // Sub1, local variable 2
11
12    char* slhello = "Hello";
13    printf("Address of s1l1 is %p\n", &s1l1);
14    printf("Address of s1l2 is %p\n", &s1l2);
15    printf("slhello is %p\n", slhello);
16 }
17
18 int sub2()
19 { // Second subroutine
20    int s2l1; // Sub1, local variable 1
21    int s2l2; // Sub1, local variable 2
22
23    char* s2hello = "Hello";
24    printf("Address of s2l1 is %p\n", &s2l1);
25    printf("Address of s2l2 is %p\n", &s2l2);
26    printf("s2hello is %p\n", s2hello);
27 }
28
29 int main(int argc, char** argv)
30 {
31    int m1l; // Main program, local variable 1
32    int m1l2; // Main program, local variable 2
33    char* p1;
34    char* p2;
35    char* p3;
36
37    printf("Address of g1 is %p\n", &g1);
38    printf("Address of g2 is %p\n", &g2);
39
40    printf("Address of m1l is %p\n", &m1l);
41    printf("Address of m1l2 is %p\n", &m1l2);
42
43    printf("Address of sub1 is %p\n", sub1);
44    printf("Address of sub2 is %p\n", sub2);
45
46    sub1();
47    sub2();
48    sub3(); // Defined in ex1b.c
49    // Get some dynamic memory
50    p1 = (char*)malloc(1);
51    p2 = (char*)malloc(1);
52    p3 = (char*)malloc(1);
53    printf("Dynamic mem 1 is %p\n", p1);
54    printf("Dynamic mem 2 is %p\n", p2);
55    printf("Dynamic mem 3 is %p\n", p3);
56 }

```

Program memory-layout-1a.c

```
1 // Example demonstrating memory address assignments, separate compilation
2 // George F. Riley, Georgia Tech, Fall 2009
3
4 int g1; // Global variable 1
5 int g2; // Global variable 2
6 int g3; // Global variable 3
7
8 int sub3()
9 { // Third subroutine
10 int s3l1; // Sub1, local variable 1
11 int s3l2; // Sub1, local variable 2
12 int s3l3; // Sub1, local variable 3
13 char* s3hello = "Hello";
14
15 printf("Sub3, Address of g1 is %p\n", &g1);
16 printf("Sub3, Address of g2 is %p\n", &g2);
17 printf("Sub3, Address of g3 is %p\n", &g3);
18
19 printf("Address of s3l1 is %p\n", &s3l1);
20 printf("Address of s3l2 is %p\n", &s3l2);
21 printf("Address of s3l3 is %p\n", &s3l3);
22 printf("s3hello is %p\n", s3hello);
23 }
```

Program memory-layout-1b.c

```
1 // Output from running program ex1
2 Address of g1 is 0x30dc
3 Address of g2 is 0x30e0
4 Address of m11 is 0xbffff8d0
5 Address of m12 is 0xbffff8d4
6 Address of sub1 is 0x28f0
7 Address of sub2 is 0x2964
8 Address of s111 is 0xbffff870
9 Address of s112 is 0xbffff874
10 s1hello is 0x2df4
11 Address of s211 is 0xbffff870
12 Address of s212 is 0xbffff874
13 s2hello is 0x2df4
14 Sub3, Address of g1 is 0x30dc
15 Sub3, Address of g2 is 0x30e0
16 Sub3, Address of g3 is 0x30e4
17 Address of s311 is 0xbffff870
18 Address of s312 is 0xbffff874
19 Address of s313 is 0xbffff878
20 s3hello is 0x2df4
21 Dynamic mem 1 is 0x500140
22 Dynamic mem 2 is 0x500150
23 Dynamic mem 3 is 0x500160
```

Program ex1-output.c