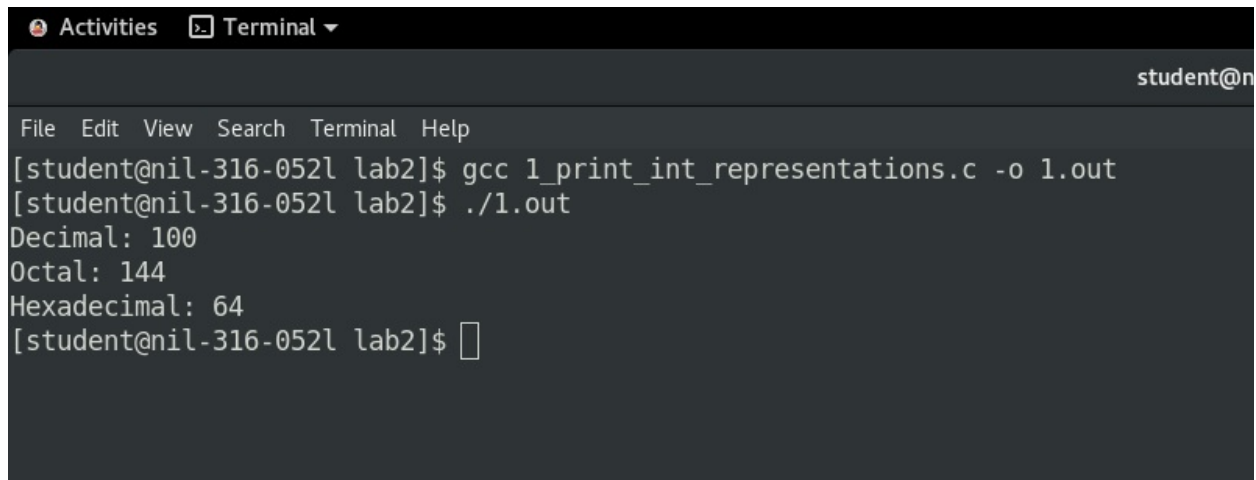
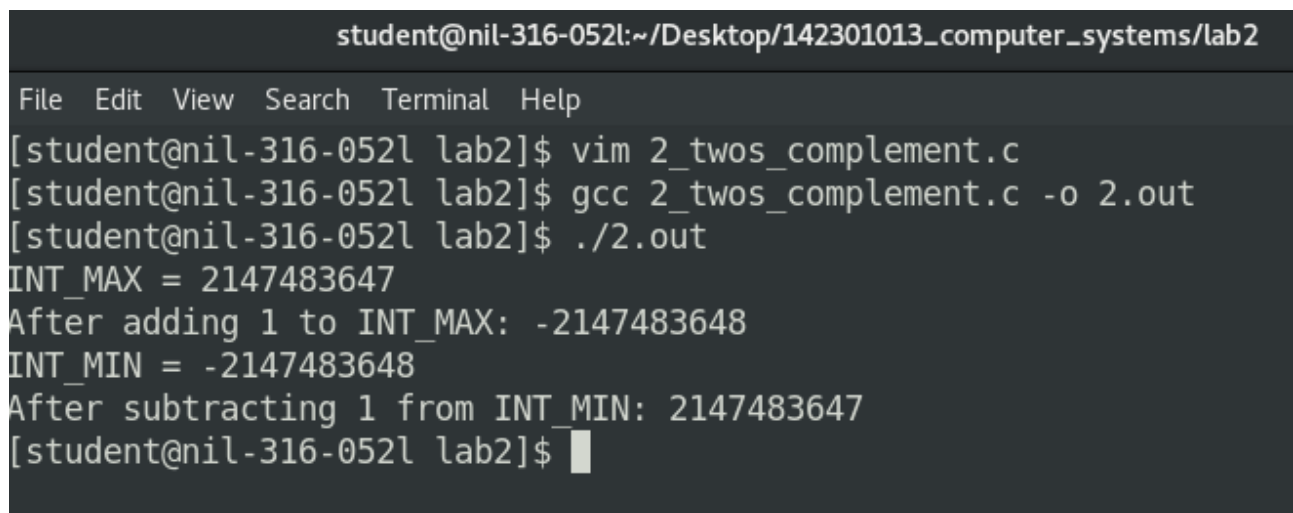


Name :- Kakaraparty Srirama Srikar
Roll No :- 142301013
Lab :- Lab-2

A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Help) and a user prompt 'student@n'. The terminal shows the following commands and output:

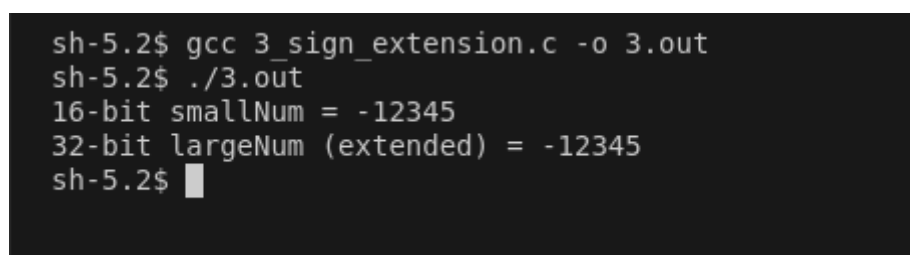
```
[student@nil-316-052l lab2]$ gcc 1_print_int_representations.c -o 1.out
[student@nil-316-052l lab2]$ ./1.out
Decimal: 100
Octal: 144
Hexadecimal: 64
[student@nil-316-052l lab2]$
```

The above is the output of Program 1.1

A terminal window titled 'student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2' with a menu bar (File, Edit, View, Search, Terminal, Help) and a user prompt '[student@nil-316-052l lab2]'. The terminal shows the following commands and output:

```
[student@nil-316-052l lab2]$ vim 2_twos_complement.c
[student@nil-316-052l lab2]$ gcc 2_twos_complement.c -o 2.out
[student@nil-316-052l lab2]$ ./2.out
INT_MAX = 2147483647
After adding 1 to INT_MAX: -2147483648
INT_MIN = -2147483648
After subtracting 1 from INT_MIN: 2147483647
[student@nil-316-052l lab2]$
```

The above is the output of Program 1.2

A terminal window titled 'sh-5.2\$' showing the following commands and output:

```
sh-5.2$ gcc 3_sign_extension.c -o 3.out
sh-5.2$ ./3.out
16-bit smallNum = -12345
32-bit largeNum (extended) = -12345
sh-5.2$
```

The above is the output of Program 1.3

```
student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 4_integer_bitwise_ops.c
[student@nil-316-052l lab2]$ gcc 4_integer_bitwise_ops.c -o 4.out
[student@nil-316-052l lab2]$ ./4.out
a = 0xF0F0F0F0
b = 0xAAAA5555
a & b = 0xA0A05050
a | b = 0xFAFAF5F5
a ^ b = 0x5A5AA5A5
a << 4 = 0x0F0F0F00
b >> 4 = 0x0AAAA555
[student@nil-316-052l lab2]$
```

The above is the output of Program 1.4

```
student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 5_endianness_check.c
[student@nil-316-052l lab2]$ gcc 5_endianness_check.c -o 5.out
[student@nil-316-052l lab2]$ ./5.out
Memory representation: 78563412
System is Little-Endian.
[student@nil-316-052l lab2]$
```

The above is the output of Program 1.5

```
student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 6_unsigned_overflow.c
[student@nil-316-052l lab2]$ gcc 6_unsigned_overflow.c -o 6.out
[student@nil-316-052l lab2]$ ./6.out
UINT_MAX = 4294967295
After adding 1 to UINT_MAX 0
[student@nil-316-052l lab2]$
```

The above is the output of Program 1.6

```

[student@nil-316-052l lab2]$ vim 7_int_mult_div.c
[student@nil-316-052l lab2]$ gcc 7_int_mult_div.c -o 7.out
[student@nil-316-052l lab2]$ ./7.out
a*b (int) = 1345294336 (overflow expected)
a*b (long long) = 400000000000
Size of int 4 bytes
Integer division of 7/2 = 3

```

The above is the output of Program 1.7 (Note that, the given number was 20000*20000, which was under the integer range, so in order to show the overflow, I had to use 200000*200000)

```

student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 8_fixed_width_integers.c
[student@nil-316-052l lab2]$ gcc 8_fixed_width_integers.c -o 8.out
[student@nil-316-052l lab2]$ ./8.out
x8 = 120
After adding 10 : x8 = -126
x16 = -126
After adding 5000 : x16 = -30536
[student@nil-316-052l lab2]$

```

The above is the output of Program 1.8

```

student@nil-316-052l:~/Desktop/142301013_co
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 9_float_rep.c
[student@nil-316-052l lab2]$ gcc 9_float_rep.c -o 9.out
[student@nil-316-052l lab2]$ ./9.out
float f: 3.141592741
double d: 3.141592653589793
[student@nil-316-052l lab2]$

```

The above is the output of Program 1.9

```

student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 10_float_rounding.c
[student@nil-316-052l lab2]$ gcc 10_float_rounding.c -o 10.out
[student@nil-316-052l lab2]$ ./10.out
Expected 10.0, got 10.000134
[student@nil-316-052l lab2]$

```

The above is the output of Program 1.10

```
student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 11_float_int_cast.c
[student@nil-316-052l lab2]$ gcc 11_float_int_cast.c -o 11.out
[student@nil-316-052l lab2]$ ./11.out
float f = 3.99
After casting to int: i = 3
double d = 123456789
After casting to int: j = 123456789
[student@nil-316-052l lab2]$ █
```

The above is the output of Program 1.11

```
student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 12_float_format_specifiers.c
[student@nil-316-052l lab2]$ gcc 12_float_format_specifiers.c -o 12.out
[student@nil-316-052l lab2]$ ./12.out
Default: 12345.678900
Fixed decimal (2 digits): 12345.68
Scientific notation: 1.234568e+04
Hexadecimal notation: 0x1.81cd6e631f8alp+13
[student@nil-316-052l lab2]$ █
```

The above is the output of Program 1.12

```
student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 13_float_comparison.c
[student@nil-316-052l lab2]$ gcc 13_float_comparison.c -o 13.out
[student@nil-316-052l lab2]$ ./13.out
x != y (due to floating point precision)
x and y are close enough
[student@nil-316-052l lab2]$ █
```

The above is the output of Program 1.13

```
student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 14_float_infinity.c
[student@nil-316-052l lab2]$ gcc 14_float_infinity.c -o 14.out
[student@nil-316-052l lab2]$ ./14.out
huge = 1.000000e+308
bigger = inf
1.0/0.0 = inf
0.0/0.0 = -nan (Nan)
[student@nil-316-052l lab2]$
```

The above is the output of Program 1.14

```
[student@nil-316-052l lab2]$ vim 15_mixed_arithmetic.c
[student@nil-316-052l lab2]$ gcc 15_mixed_arithmetic.c -o 15.out
[student@nil-316-052l lab2]$ ./15.out
i+f=7.50
(double) i/2 = 2.50
(int)(i*f)= 12
[student@nil-316-052l lab2]$
```

The above is the output of Program 1.15

```
student@nil-316-052l:~/Desktop/142301013_computer_systems/lab2
File Edit View Search Terminal Help
[student@nil-316-052l lab2]$ vim 16_bit_reverse.c
[student@nil-316-052l lab2]$ gcc 16_bit_reverse.c -o 16.out
[student@nil-316-052l lab2]$ ./16.out
Original: 0x01235678
Reversed: 0x1E6AC480
[student@nil-316-052l lab2]$
```

The above is the output of Program 1.16

```
sh-5.2$ gcc 17_bit_rotate.c -o 17.out
sh-5.2$ ./17.out
Original: 0xABCDEF12
Rotated L4: 0xBCDEF12A
Rotated R4: 0x2ABCDEF1
sh-5.2$
```

The above is the output of the Program 1.17

```
sh-5.2$ gcc 18_count_set_bits.c -o 18.out
sh-5.2$ ./18.out
Number = 0xF0F0F0F0
Set bits = 16
sh-5.2$ █
```

The above is the output of the program 1.18

```
sh-5.2$ gcc 19_check_sign.c -o 19.out
sh-5.2$ ./19.out
Signed s = -42
Unsigned u = 4294967254
Sign bit of s: 1
sh-5.2$ █
```

The above is the output of the program 1.19

```
sh-5.2$ gcc 20_bit_set_clear.c -o 20.out
sh-5.2$ ./20.out
Original x = 0xFF00FF00
After clearing lower 8 bits = 0xFF00FF00
After setting bits 8-15 = 0xFF00FF00
sh-5.2$ █
```

The above is the output of the program 1.20

```
sh-5.2$ gcc 21_signed_to_unsigned.c -o 21.out
sh-5.2$ ./21.out
signed int: -12345
unsigned int: 4294954951
as hex: 0xFFFFCFC7
sh-5.2$ █
```

The above is the output of the program 1.21

```
sh-5.2$ gcc 22_extract_bytes.c -o 22.out
sh-5.2$ ./22.out
val = 0x12345678
Byte 0: 0x78
Byte 1: 0x56
Byte 2: 0x34
Byte 3: 0x12
sh-5.2$
```

The above is the output of the program 1.22

```
sh-5.2$ gcc 23_negative_shift.c -o 23.out
sh-5.2$ ./23.out
neg (signed) = -1
uneg (unsigned) = 4294967295
neg >> 1 = -1 (0xFFFFFFFF)
uneg >> 1 = 2147483647 (0x7FFFFFFF)
sh-5.2$
```

The above is the output of the program 1.23