16.070 Introduction to Computers and Programming

Due: 7 March 2001  Problem Set 4  Spring 2001

All of the homework guidelines should be followed. Be sure to comment your code and make it readable. Points will be deducted if the guidelines are not followed. Indicate how much time you spent on each problem.

Problem 1 (15%)
Write one program that performs the following two functions:
1. Prompt a user for an integer value and then print out the character in the ASCII table that corresponds to that value.
2. After completing the character printout above, prompt the user for a character input and displays the ASCII table index value of the input character.

Test your program with the following ASCII table indexes: 65, 13, 10, 126
Also find the indexes of the following characters: ‘a’, ‘A’, ‘0’, ‘1’, ‘2’, ‘3’

Turn In: Printout of source code, screen dump of the test cases, also copy your program username_PS4_P1.c to \CDIO-Prime\16.070HW\PS4\P1\. Indicate how much time you spent on this problem.

Problem 2 (20%)
It is important to understand the rules that a compiler uses for type conversion. Assume the following type declarations have been made.

```c
char c;
int i;
float f;
double d;
```

Determine the resulting data type of the following statements, according to ANSI rules of conversion. Explain your answer with one short sentence.

1. `c + ‘a’ * ‘b’;`
2. `i *9 /5;`
3. `f +9 -2.0;`
4. `d / 32.0 * 90;`
5. `f / (float)d +i;`
6. `i +c /11;`

Turn In: Typed answers. Indicate how much time you spent on this problem.
**Problem 3 (25%)**
Each variable has three pieces of information associated with it, the value assigned to the variable, its address in memory and its size. Write a short program that will print out the three pieces of information associated with the following variables.

```c
char c = 'a';
int i = 9;
float f = 2.7;
double d = 22.1;
```

The program should print out the addresses, values, and sizes (use the `sizeof` operator) of the above variables. Format each variable address both in hexadecimal and in decimal.

**Turn In:** Printout of source code, screen dump of sample run, also copy your program `username_PS4_P3.c` to `\CDIO-Prime\16.070HW\PS4\P3`. Indicate how much time you spent on this problem.

**Problem 4 (40%)**
Write a program that determines the maximum value (test the overflow) of type `int` variables. Once you have found the maximum value, determine what happens when you exceed that value. Print relevant information to the screen.

**Turn In:** Printout of source code, screen dump of output and an explanation of your observations. Also copy your program `username_PS4_P4.c` to `\CDIO-Prime\16.070HW\PS4\P4`. Indicate how much time you spent on this problem.