

13. Assume that a program contains the following declarations:

```
char c = '\1';
short s = 2;
int i = -3;
long m = 5;
float f = 6.5f;
double d = 7.5;
```

Give the value and the type of each expression listed below.

- | | | |
|------------------------|------------------------|--------------------------|
| (a) <code>c * i</code> | (c) <code>f / c</code> | (e) <code>f - d</code> |
| (b) <code>s + m</code> | (d) <code>d / s</code> | (f) <code>(int) f</code> |

- W 14. Does the following statement always compute the fractional part of `f` correctly (assuming that `f` and `frac_part` are `float` variables)?

```
frac_part = f - (int) f;
```

If not, what's the problem?

Section 7.5

15. Use `typedef` to create types named `Int8`, `Int16`, and `Int32`. Define the types so that they represent 8-bit, 16-bit, and 32-bit integers on your machine.

Programming Projects

- W 1. The `square2.c` program of Section 6.3 will fail (usually by printing strange answers) if `i * i` exceeds the maximum `int` value. Run the program and determine the smallest value of `n` that causes failure. Try changing the type of `i` to `short` and running the program again. (Don't forget to update the conversion specifications in the call of `printf`!) Then try `long`. From these experiments, what can you conclude about the number of bits used to store integer types on your machine?
- W 2. Modify the `square2.c` program of Section 6.3 so that it pauses after every 24 squares and displays the following message:
- ```
Press Enter to continue...
```
- After displaying the message, the program should use `getchar` to read a character. `getchar` won't allow the program to continue until the user presses the Enter key.
3. Modify the `sum2.c` program of Section 7.1 to sum a series of `double` values.
4. Write a program that translates an alphabetic phone number into numeric form:
- ```
Enter phone number: CALLATT
2255288
```
- (In case you don't have a telephone nearby, here are the letters on the keys: 2=ABC, 3=DEF, 4=GHI, 5=JKL, 6=MNO, 7=PRS, 8=TUV, 9=WXYZ.) If the original phone number contains nonalphabetic characters (digits or punctuation, for example), leave them unchanged:
- ```
Enter phone number: 1-800-COL-LECT
1-800-265-5328
```
- You may assume that any letters entered by the user are upper case.