1. (5%)

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?

2. (5%)

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) `c * i` (c) `f / c` (e) `f - d`
(b) `s + m` (d) `d / s` (f) `(int) f`

3. (5%) Write a declaration of an array named weekend containing seven bool values. Include an initializer that makes the first and last values true; all other values should be false.

4. (5%) Which ones of the following would not be valid prototype for a function that returns nothing and has one double parameter? Explain your answer.
(a) void f(double x); (b) void f(double); (c) void f(x); (d) f(double x);

5. (5%) What is the output of the following program?

```
#include <stdio.h>

void swap(int a, int b);

int main(void)
{
  int i = 1, j = 2;

  swap(i, j);
  printf("i = %d, j = %d\n", i, j);
  return 0;
}

void swap(int a, int b)
{
  int temp = a;
  a = b;
  b = temp;
}
```

1. You are given N nonnegative numbers in the range of 0 to 499. Write a funcintion ***int find(int list[], int N)*** that returns the number which occurs most frequently. (25%)

2. Given N points indexed from 0 to N-1 on the X-Y plane, you want to find the two points which are the closest. To this end, you are to write a function with the following prototype: ***void closest(int x[], y[], int N, int result[]),*** where x[] and y[] are two arrays that hold the x and y coordinates of the N points, respectively, and result is an array of size two that is used to store the indices of the two closest points. (25%)

3. Given an N by M matrix A and an M by K matrix B, you are to compute their product in a function that has the following prototype: ***void multiply(int A[][M], int B[][K], int N, int product[][K])***. (25%)