Problem 1 Consider the following C++ program.

```cpp
#include <iostream>
using namespace std;

int fun(int &x, int y) {
    x = x + 1;
    y = y - 1;
    return y;
}

int main() {
    int x = 2, y = 7, z = 10; string s = "007";
    cout << ((double) y) / x << endl; // line (a)
    if (!((x > y) && (y > 5))) s = "008";
    cout << s << endl; // line (b)
    z %= y; cout << z << endl; // line (c)
    cout << fun(z, y) << endl; // line (d)
    fun(x, y); cout << y - x * 2 << endl; // line (e)
}
```

(a) What is the output at line (a)?
(b) What is the output at line (b)?
(c) What is the output at line (c)?
(d) What is the output at line (d)?
(e) What is the output at line (e)?

Problem 2 Write title lines for the functions that are called by the following main program. Do not supply the blocks for the functions.

```cpp
int main() {
    int x = 0, y = 1, z = 2;
    x = larger(x + y, z); // (a) sets x as the larger
    x = largest(x, y, y, z); // (b) sets x as the largest
    boost(x, y); // (c) increase x by the value of y
    boost(y, mystery(y, z)); // (d) boosts y by a mystery amount
    return 0;
}
```

Problem 3 Write blocks of code to perform the functions used in the following main program. Your blocks must match the given title lines. Each block should be a short function of only a few lines.

```cpp
int main() {
    int b = 1, c = 2;
```
// (a) Print the number of odd arguments, here 1
cout << numberOdd(7,8) << endl;

// (b) Reorder arguments so that they increase, here swap them
sort(c, b);

// (c) Print closest integer here 4
cout << closest(3.75) << endl;

// (d) Print the first digit, assume argument is positive. Here 1.
cout << firstDigit(19683) << endl;
return 0;
}

Problem 4 Consider the following C++ program.

#include <iostream>
using namespace std;

int fun(int &x, int &y) {
    if (y <= 0) return x;
    x = x + 2;
    cout << x << y << endl;
    return x * y;
}

int main() {
    int x = 5, y = -1;
    cout << fun(x, y) << endl; // line a
    fun(y, x); // line b
    fun(x, y); // line c
    fun(y, x); // line d
    cout << fun(x, y) << endl; // line e
    return 0;
}

What is the output from the program at each of the following lines:
(a) line a:
(b) line b:
(c) line c:
(d) line d:
(e) line e:
**Problem 5** Consider the following C++ program.

```cpp
#include <iostream>
using namespace std;

int fun(int &x, int y) {
    if (y <= 0) return x;
    x = x + 1;
    y = y + 1;
    cout << x << y << endl;
    return x * y;
}

int main() {
    int x = 5, y = -1;
    cout << fun(x, y) << endl; // line a
    fun(x, 1); // line b
    fun(y, 1); // line c
    fun(y, x); // line d
    cout << fun(x, 2) << endl; // line e
    return 0;
}
```

What is the output from the program at each of the following lines:
(a) line a:
(b) line b:
(c) line c:
(d) line d:
(e) line e:

**Problem 6** Write header lines (prototypes) for the following functions. Do not supply the blocks for the functions.

(a) A function called `sumDigits` which returns the sum of the digits of an integer.

(b) A function called `isSmall` that returns an answer of true if a double precision parameter has a value between 0 and 0.001. (It returns false otherwise.)

Answer:
(c) A function called `randomLetter` which generates and returns a random letter of the alphabet. (The output is to be a single character between ‘A’ and ‘Z’.)

(d) A function called `sort3` which is to change a collection of three input values so that they appear in increasing order.