1. Consider the following recursive function called `countdown`.

```c
void countdown (int n) {
    if (n == 0)
        cout << "Blastoff!" << endl;
    else {
        cout << n << endl;
        countdown(n - 1);
        countdown(n - 1);
    }
}
```

(a) What does `countdown(0)` print?
(b) What does `countdown(1)` print?
(c) What does `countdown(2)` print?
(d) Consider `countdown(3)`. Make a 'tree of calls' for `countdown(3)`. How many times is `Blastoff!` printed? How many times is the integer 1 printed? the integer 2? the integer 3?

2. Write a recursive function called `reverse` that will reverse the digits in the positive integer parameter `n`. For example, if `n = 57384`, then `reverse` should print 48375.

```c
void reverse (int n) {
...
}
```

3. Consider the following recursive function called `mystery`.

```c
double mystery (double x, int n) {
    double temp;
    if (n == 0)
        return 1;
    else if (n % 2 == 0) {
        temp = mystery (x, n / 2);
        return temp * temp;
    } else {
        return x * mystery (x, n - 1);
    }
}
```
(a) In exactly one sentence, describe what this function is doing.
(b) Find the value of \texttt{mystery(2, 5)}.

4. Write a recursive function called \texttt{downUp} that prints the digits from \texttt{n} down to 0 and then back up to \texttt{n} where \texttt{n} is a nonnegative integer. For example, \texttt{downUp(7)} would print 765432101234567.

5. Consider the following recursive function \texttt{foo}.

\begin{verbatim}
int foo (int x, int y) {
    if (x == 1)
        return y;
    else if (x % 2 == 0) {
        return foo(x / 2, 2 * y);
    } else
        return y + foo(x / 2, 2 * y);
}
\end{verbatim}

What is returned by \texttt{foo(11, 3)}?

6. Consider the following class declaration called \texttt{money}.

\begin{verbatim}
class money {
private:
    int dollars,
    cents;    //an integer between 0 and 99
public:
    *****
};
\end{verbatim}

(a) Write a constructor that creates a \texttt{money} object with value $0.00.
(b) Write a member function called \texttt{add} that adds the receiver to the parameter \texttt{m}. Remember that the number of cents must be between 0 and 99. Use the ‘/’ and ‘%’ operators.

\begin{verbatim}
void add (money m) {
}
\end{verbatim}

(c) Write a member function called \texttt{displayMoney} that displays a \texttt{money} object in the usual way. For example, 3 dollars and 5 cents would be displayed as $3.05.

\begin{verbatim}
void displayMoney () {
}
\end{verbatim}