1. Break the following command line into tokens. Explain in words what each token in this command line does.
g++ -g example.cpp -o example 2> errors

2. How can you kill a running program which has an infinite loop or which is not responding? Can you use gdb to help find out where the error is? How?

3. The code below accepts positive decimal numbers from the user and computes the sum. The user enters 0.0 for end of input. There is at least one potential error in the code, and possibly others. Find all errors, explain them, and fix the code.
   
   ```cpp
double next, sum;
while(next != 0.0)
{
    cout << "\n enter a decimal: ";
    cin >> next;
    sum = sum + next;
}

cout << "The sum of your numbers is " << sum;
```

4. The function prototype for a function convex is given below. The function computes \((a + c)/2 - b\). If this value is positive, it is returned; if negative, zero is returned. Write the code for the function NOTE: there should be no input or output in the function itself.

   ```cpp
double convex(double a, double b, double c);
```

5a. If we have a statistical program which accepts double precision reals typed by the user (from the keyboard) and ending with 0.0 how could we make it easier so that the user could put the integers in a datafile? Tell specifically what should be done and how the program should be invoked.

5b. The character variable khar is supposed to contain one of the letters from the word "while". A programmer has written the switch statement below to classify the options but has made some errors. Fix the switch statement.

   ```cpp
switch(khar) {
    case 'i': ;
    case 'e': cout << "vowel";
        continue;
    case 'w': ;
```
case 'h':  ;
case 'l': cout << "consonent";
default: cout << "error, not in while"; }

6. You want to write a program using a constant which, now, is 1000. However, you might be asked by your boss to change this constant later on. What is the best way to write this into the program so that that future changes will be easy?

7. For each of the following code blocks (the full program is not shown – only the first part of main()), there is an error which might be syntactic, logical, or something which will produce a run-time exception. Find the error and correct it.

7a.
int main()
{
    int i;
    for (i = 10 ; i >= 1 ; i--);
    cout << "\n " << 100/i;
    ...

7b.
int main()
{
    int x, y;
    double z;
    x = 45;
    y = 44;
y = y/x;
z = 11/y;
    ...

7c.
int main()
{
double x;
cout << "\n Enter x ";
cin >> x;
if ( (x % 5) == 0 )
cout << "x is divisible by 5"
    ...

8. In the function fact() below the one parameter is declared as int n. The
programmer has written the following lines in main():

```c
int n, m;
n = 7;
m = fact(n);
```

Will running the third line above change the value of n (from 7) in main()? Why or why not?

```c
int fact(int n) {
    int result;
    result = 1;
    while( n != 1) {
        result = result * n;
        n--; }
    return(result); }
```

9. Tell exactly what will appear on the screen at runtime:

```c
int k, n;
n = 25;
for(k = 2; k < n ; k++) {
    if ( (n % k) == 0) break;
    cout << "\n k=" << k;
}
```

10. Someone has written the following function. Trace the function call gcd(60,34) and find out what will be returned.

```c
int gcd(int larger, int smaller) {
    int remainder;
    do {
        remainder = larger % smaller;
        larger = smaller;
        smaller = remainder;
    } while( remainder > 0);
    return(larger); }
```

11. What is the difference between the following two prototype declarations in terms of how the parameter is passed to the function? Be precise in your explanation.

```c
double func(double x);
double func(double & x);
```