Error Handling

Review of Streams

- In c / POSIX operating systems all inputs / outputs are made through streams.

Stream	
Stdout	Standard output (usually screen)
Stdin	Standard input (usually keyboard)
FILE stream	File on the hard drive
Stderr	Standard Error (usually screen)

- All of these can be redirected.

Printing to standard error

- The most general way to print to standard error is to use fprintf.

```c
#include<stdio.h>
#include<stdlib.h>

int main()
{
  // Opens a file named "file.txt" in read mode, pointer is NULL if does not exist
  FILE *fptr = fopen("file.txt","r");
  if (fptr == NULL){
    fprintf(stderr,"File does not exist\n");
    exit(0);//terminates calling process (in this case main)
  }
  char buffer[128];
  fscanf(fptr,"%s",buffer);
  printf("Contents of buffer are %s\n",buffer); //prints contents of string to stdout
}
```

The perror function

- The function perror gives a simpler way to write to standard out.

```
void perror(const char *str)
```

- perror("This is an error message: ");

```
int main()
{
  int a,b;
  printf("input integers a, b\n");
  scanf("%d %d",&a,&b);
  double c = (double) a/b;
  if (b==0){
    perror("divide by zero error: ");
    exit(0);
  }
  else{
    printf("Quotient a/b is %g\n",c);
  }
}
```

```
divide by zero error: : Success
```

Error Numbers

- The "success" flag at the end of perror is given by the error number

```
char *strerror(int errnum);
```

- This function returns a string corresponding to the error number.

- puts(strerror(errnum)) will print a specific error message.

- Important ones:
    - EDOM (33), domain error
    - ERANGE (34), range error
    - EEXIST (17), file exists

Example

```c
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
#include<string.h>
#include<errno.h>
int main()
{
  int a,b;
  printf("input integers a, b\n");
  scanf("%d %d",&a,&b);
  double c = (double) a/b;
  if (b==0){
    errno = EDOM; //Sets the error to be 33 which is a domain error
    perror("divide by zero error: ");
    exit(0);
  }
  else{
    printf("Quotient a/b is %g\n",c);
  }
}
```

```
input integers a, b
5 0
divide by zero error: : Numerical argument out of domain
```