ELEC 377
Operating Systems

Tutorial/Lab
Week 2/3

Pointers to functions

- in Java, you passed an object to have another function call you back

```
class foo implements ActionListener{
    void action(){
        ...
    }
    void init(){
       ...
        panel.addListener(this);
    }
}
```

Pointers to functions

- in C, no object instances with methods to pass.
    - ◊ instead we pass a pointer to a function
    - ◊ a function name by itself is a constant pointer

```
int lt(int x, int y) { return x < y; }

int (*f)(int,int); // f  is a function with 2 int parms
                   // and returns int
int main(){
   f = lt;
   printf(“%d\n”,    (*f)(2,3)    ); // prints number 1
}
```

Pointers to functions

- brackets important!!!!

*f(2,3) -> call function named f with the parameters 2 and 3 and treat the result as a pointer and dereference the pointer

(*f)(2,3) -> use f as a pointer to a function and call with the parameters 2 and 3

Lab 1 main program

```
int main(){
  struct dirent **namelist;
  int n;

   n = scandir("/proc", &namelist,
                 isProcessDir, NULL);


   ....
  }
```

Lab 1 main program

```
int main(){
  struct dirent **namelist;
  int n;

   n = scandir("/proc", &namelist,
                 isProcessDir, NULL);


   ....
  }
```

array of pointers to struct dirent

Lab 1 main program

```
int main(){
  struct dirent **namelist;
  int n;

   n = scandir("/proc", &namelist,
                  isProcessDir, NULL);

   ....
  }
```

Lab 1

```
int isProcessDir(const struct dirent* d){
   ... return 1 if a process, 0 if not a process...
      ... i.e. all characters of the name
             (d->d_name are digits...)
}
```

Lab 1 main program

```
int main(){
  struct dirent **namelist;
  int n;

   n = scandir("/proc", &namelist,
                 isProcessDir, NULL);

   ....  use namelist[i]->d_name ....
   ... string concatentation (status) ....
   .... open file and read info.
  }
```

Lab1

- Do the lab iteratively

  – start by writing the isProcessdir function and print d_name fields of the namelist.

  ****test ****

  - Then do the string concatenation and print the resulting file names

  - Then open the files to get and print the information.

- Links to tutorials for the following editors are on the website: jed,joe, vi

Stack Overflow

- The point of this lab is to familiarize yourself with C, function pointers and the link between C and the low level memory representation.
  - Stack overflow will tell you about strrspan, etc.
  - Not the point of the lab.
  - Also, do not use fscanf. Use fgets and work with the bytes of the line directly.

Testing

- What command provides the same data as your program
  - What options
  - use the 'man' command to find out about options

- What are the differences, why are they there?