

**Puzzle #1** A most powerful program. Can we fix it?

```

1: int main(int argc, char**argv) {
2:     printf("Executing %s ...\n", argv+1);
3:     execvp( argv + 1, argv + 1);
4:     perror("Failed to be all powerful");
5: }

```

**Example:** Use getline to read a text file

```

1: int main(int argc, char**argv) {
2:     if(argc != 2)
3:         fprintf(stderr, "Usage: %s filename\n", argv[0]);
4:
5:     FILE* file = fopen(argv[1], "r"); // may return NULL
6:     char* line = NULL;
7:     size_t capacity;
8:     ssize_t bytesread;
9:     int linenumber = 0;
10:    while(1) {
11:        bytesread = getline( &line, &capacity, file);
12:        if(bytesread == -1) break;
13:        printf("%3d: %s", linenumber++, line);
14:    }
15:    free(line);
16:    fclose(file);
17:    return 0;
18: }

```

**Puzzle #2:** Fix my getline implementation. What asserts might you add?

```

1: ssize_t getline(char **lineptr, size_t *n, FILE
2: *stream){
3:     what asserts would you add here?
4:     if( _____ ) { *n = 256; _____ = malloc(*n); }
5:     size_t bytesread = 0;
6:     int c = 0;
7:     while( ferror(stream)==0 && feof(stream)==0 ){
8:         if (bytesread == *n) { /* extend buffer */ }
9:         c = fgetc(stream);
10:        lineptr = c; // FIX ME
11:        if(c) return bytesread; // FIX ME
12:    }
13:    return -1; // error (e.g. end of file)

```

assert?

**FIX ME #1:****FIX ME #2:****Puzzle #3** What is wrong with the following?

```

1: int main(int argc, char** argv) {
2:     char** lineptr;
3:     size_t size;
4:     size = getline(lineptr, &size, stdin);
5:     execlp(lineptr);
6:     return 0;
7: }

```

Your notes about fork, exec

**Environmental Variables**

- What is getenv("HOME");
- What is getenv("PATH");
- What is getenv("USER");
- What is getenv("AWESOME");

**Puzzle #4** What does the following example do? How does it work?

```
1: int main() {
2:     close(1); // close standard out
3:     open("log.txt", O_RDWR | O_CREAT | O_APPEND, S_IRUSR |
4:     S_IWUSR);
5:     puts("Captain's log");
6:     chdir("/usr/include");
7:     execl("/bin/ls", "/bin/ls", ".", (char*)NULL); // "ls ."
8:     perror("exec failed");
9:     return 0; // Not expected
11: }
```

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**Puzzle #5** Why is this 'broken'?

```
1: int main(int argc, char**argv) {
2:     srand(time(NULL));
3:     pid_t child = fork();
4:     printf("My fork value is %d\n", (int) child );
5:     int r = rand() & 0xf;
6:     printf("%d: My random number is %d\n", getpid(), r);
7:     return 0;
8: }
```

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**Puzzle #6** What is this madness!?

```
1: int main(int c, char **v)
2: {
3:     while (--c > 1 && !fork());
4:     int val = atoi(v[c]);
5:     sleep(val);
6:     printf("%d\n", val);
7:     return 0;
8: }
```

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