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| **CS 241** | **Lecture Handout #5**  January 29, 2016 |

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

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

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

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

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

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

**assert?**

**FIX ME #1:**

**FIX ME #2:**

**Puzzle #3** What is wrong with the following?

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

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?

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| **1: 2:**  **3: 4:**  **5: 6:**  **7: 8:**  **9:**  **10:**  **11:** | int main() {  close(1); // close standard out  open("log.txt", O\_RDWR | O\_CREAT | O\_APPEND, S\_IRUSR | S\_IWUSR);  puts("Captain's log");  chdir("/usr/include");  execl("/bin/ls", "/bin/ls",".",(char\*)NULL); // "ls ."  perror("exec failed");  return 0; // Not expected  } |

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

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| **1: 2:**  **3: 4:**  **5: 6:**  **7:**  **8:**  **9:** | int main(int argc, char\*\*argv) {  srand(time(NULL));  pid\_t child = fork();  printf("My fork value is %d\n", (int) child );  int r = rand() & 0xf;  printf("%d: My random number is %d\n", getpid(), r);  return 0;  } |

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

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| **1: 2:**  **3: 4:**  **5: 6:**  **7:**  **8:**  **9:** | int main(int c, char \*\*v)  {  while (--c > 1 && !fork());  int val = atoi(v[c]);  sleep(val);  printf("%d\n", val);  return 0;  } |