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| **CS 241** | **Lecture Handout #4**  January 27, 2016 |

**From Monday’s lecture:**

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| **1: 2:**  **3: 4:**  **5: 6:**  **7: 8:**  **9:**  **10:**  **11:**  **12:**  **13:**  **14:**  **15:**  **16:**  **17:**  **18:**  **19:** | **// Sum an array of positive numbers, storing**  **// the result in `result` (by ref)**  **void mysum(const int \*ptr, int \*result) {**    **\*result = malloc( );     while ( \*ptr ) {    sum += \*(ptr++);    }    return sum;**  **}** |

**Puzzle #1:** Create a custom string concatenation function

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| **1: 2:**  **3: 4:**  **5: 6:**  **7: 8:**  **9:**  **10:** | **char \*mystrcat(char \*dest, char \*src) {**  **}** |

**Using read():**

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| **ssize\_t read(int fd, void \*buf, size\_t c ount);** |

…what type of call is read?

…how would we use it?

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| **1:**  **2:**  **3:** |  |

**Using scanf():**

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| **int scanf(const char \* format, ...);** |

In **scanf**, the format string is the same as **printf** except that every type must be passed by reference to be written into by **scanf**:

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| **Specifier:** | **d i** | **u o x** | **f** | **c s** | **p** |
| **Type:** |  |  |  |  |  |

Return value?

Example:

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| **1:**  **2:**  **3:**  **4:** | **int num; char c;**  **int result = scanf("%d %c", &num, &c);**  **printf("Values: %d %c\n", num, c);**  **printf("Return value: %d\n", result);** |

…what is the return value of the input: **7 hello**

…what is the return value of the input: **6** *(…followed by an EOF)*

**Using getline():**

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| **ssize\_t getline(char \*\*lineptr, size\_t \*n, FILE \*stream);** |

The C-string passed by reference as **lineptr** will store the line; the size of the memory allocated in **lineptr** must be stored in **n** (to avoid overflow). Additionally:

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| If **\*lineptr** is set to **NULL** and **\*n** is set **0** before the call, then **getline()** will allocate a buffer for storing the line. This buffer should be freed by the user program even if **getline()** failed. |

*…found in* ***man getline***

Example usage:

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| **1:**  **2:**  **...**  **n:** | **char \*s = NULL; int n = 0;**  **getline(&s, &n, stdin);**  **...**  **free(s);** |

**Processes:** *“I’m a nightmare dressed like a daydream”*

A process is the base computation container on Linux; multiple processes allow for multiple separate (and parallel) execution.

**Q:** System call to make a new process?

**Environmental Variables**

Process-specific dictionary that stores information about the execution environment:

* Command line:
* C programming:

**Meta Example:** *“Let is snow, let it snow!”*

**snowflake.c** attempts to create a snowstorm where every snowflake is a process *(found in /\_shared/ in the CS 241 svn)*. Screen cursor logic is provided, simple API is:

* **int rows**: contains the number of rows of the terminal/console
* **int cols**: contains the number of columns of the terminal/console
* **gotoxy(x, y)**: moves cursor to a given **x**, **y** position

The key function, **snowflake()**:

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| **1: 2:**  **3: 4:**  **5: 6:**  **7: 8:**  **9:**  **10:**  **11:**  **12:**  **13:**  **14:** | **void snowflake() {**  **srand((unsigned)time(NULL));**  **int col = rand() % cols;**  **int row = 0;**  **while (row < rows) {**  **gotoxy(row, col);**  **fprintf(stderr, "\*");**  **usleep(200000);**  **gotoxy(row, col);**  **fprintf(stderr, " ");**  **row++;**  **}**  **}** |

**Fix #1:**

**Fix #2:**

**Fix #3:**

**Fix #4:**