
SLP-assignment #6: concat

(10 points, no groups)

Implement a program `concat` (concatenate) that combines the command line arguments inside a dynamically allocated buffer to a single string which is then outputted in the terminal. The parameters have to be divided by spaces.

If no parameters are passed, the program should terminate with the code `EXIT_SUCCESS` and without any output.

Examples:

```
$> ./concat This is a test
This is a test
$>
```

```
$> ./concat      Foo      Bar
Foo Bar
$>
```

```
$> ./concat
$>
```

Program structure:

The `concat` program should be divided into following steps:

1. Iterate over all command-line arguments and determine the total length with `str_len`
2. Dynamically allocate the memory required for the combined string with `malloc(3)`
3. Combine the string with the auxiliary functions `str_cpy` and `str_cat`
4. Call `printf(3)` for the output of the combined string only once
5. Free the allocated memory with `free(3)`

Hints:

- Implement `str_len`, `str_cpy` and `str_cat` analogously to the library functions `strlen(3)`, `strcpy(3)` and `strcat(3)`. A call to the original library functions will yield no points. Your function should exactly replicate the behaviour described in the man pages.
- Always give a reason why you use the `volatile` keyword. If the same reasoning holds for multiple variables, you can justify them together.
- In the directory `/proj/i4spic/<login>/pub/aufgabe6/` you will find the file `concat` that contains a reference implementation.
- Always make sure to give out meaningful error messages on the standard error stream. (`fprintf(stderr, ...)(3)` / `perror(3)`)
- You can test your program with `valgrind`. This may help when searching for errors. *Suppressed errors* can be ignored. More error messages can be obtained by using `valgrind` with the flags `--leak-check=full --show-reachable=yes` and building the binary program with debug symbols.
- Your program has to compile with the following flags:
`gcc -std=c11 -pedantic -D_XOPEN_SOURCE=700 -Wall -Werror -O3 -o concat concat.c`
This configuration is also used for grading.
- Functions of the `libc` that do not require error handling in SLP can be seen online in the Linux `libc-Doku`.

Deadline

T01	23.06.2024	18:00:00
T02	23.06.2024	18:00:00
T03	24.06.2024	18:00:00
T04	25.06.2024	18:00:00
T05	25.06.2024	18:00:00
T06	26.06.2024	18:00:00
T07	26.06.2024	18:00:00
T08	27.06.2024	18:00:00
T09	24.06.2024	18:00:00