

More on Pointers

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- Pointer arithmetic
- Pointers to functions

Recap on Pointer Arithmetic

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Printing command-line arguments (yet again)

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```
#include <stdio.h>

int main(int argc, const char * argv[]) {
    int i;
    for(i = 0; i < argc; ++i)
        printf("%s\n", *(argv + i));
    return 0;
}
```

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    return 0;
}
```

```
#include <stdio.h>

int main(int argc, const char * argv[]) {
    const char ** s;
    for(s = argv; s - argv < argc; ++s)
        printf("%s\n", *s);
    return 0;
}
```

Exercise: implement a variable-length array

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```
#ifndef VARARRAY_H_INCLUDED
#define VARARRAY_H_INCLUDED

struct var_int_array;

extern struct var_int_array * var_int_array_new();
extern void var_int_array_destroy(struct var_int_array *);

extern int var_int_array_get_size(const struct var_int_array *);

extern int var_int_array_append(struct var_int_array *, int);

extern int var_int_array_get(const struct var_int_array *, int);
extern void var_int_array_put(struct var_int_array *, int, int);

#endif
```

Use the `realloc` function to grow and shrink the array storage.

Exercise: implement *insertion-sort* on an array of integers

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Exercise: implement *quick-sort* on an array of integers

Pointers to Functions (Example)

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```
void print_string_vanilla(const char * s) {
    while (*s) putchar(*s++);
    putchar('\n');
}
void print_string_strawberry(const char * s) {
    printf("=== %s ===\n", s);
}
void print_string_chocolate(const char * s) {
    printf("a string of %zd characters: %s\n", strlen(s), s);
}
int main(int argc, const char * argv[]) {
    void (*print)(const char *); /* pointer to function */
    switch (*argv[1]) {
        case 'v': print = print_string_vanilla; break;
        case 's': print = print_string_strawberry; break;
        case 'c': print = print_string_chocolate; break;
    }
    for(int i = 0; i < argc; ++i)
        print(argv[i]);
}
```