

ECE220 Lab4

Brain Teaser – Swapping Data

Version 1

- `void swap(int *x, int *y) {`
- `int temp = *x;`
- `*x = *y;`
- `*y = temp;`
- `}`

Version 2

- `void swap(int *x, int *y) {`
- `*x ^= *y;`
- `*y ^= *x;`
- `*x ^= *y;`
- `}`

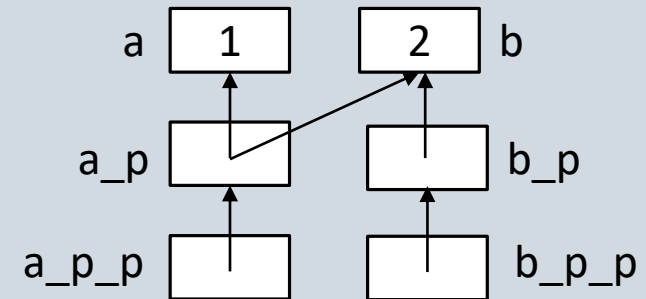
Brain Teaser – Fun with Pointers

Multi-line vs one-line initialization

- `int a = 1;`
`int b = 2;`
- `int a = 1, b = 2;`
- `int* a_p = &a;`
`int* b_p = &b;`
- `int *a_p = &a, *b_p = &b;`

Double pointers

- `int a = 1, b = 2;`
- `int *a_p = &a, *b_p = &b;`
- `int **a_p_p = &a_p, **b_p_p = &b_p;`



- `*a_p_p = &b;` //What changes?

Function Pointers

Add function

- `int add(int x, int y) {`
 - `return x + y;`
- `}`

Main function

- `int main() {`
 - `int (*add_ptr)(int, int) = &add;`
 - `int sum = (*add_ptr)(2, 3);`
- `}`

Passing as parameter

- `int add2to3(int (*add_ptr)(int, int)) {`
 - `return (*add_ptr)(2, 3)`
- `}`

Return value

- `int (*much_confusion(int x))(int, int) {`
 - `printf("%Got parameter %d\n", x);`
 - `int (*add_ptr)(int, int) = &add;`
 - `return add_ptr`
- `}`



MP4 - Codebreaker

Implement game of Mastermind

- only elements things to guess
- elements $\in [1, 8]$ rather than colors

Feedback

- perfect or misplaced matches

Example:

- Actual: 1357, guess: 9753
 - Perfect: 5
 - Misplaced 7, 3

Implement using pointers or arrays

MP4 User input

Program only takes a single number as input:

- 1234
- 123abc, abc123, 3 5

sscanf(const char * s, const char * format) – reads data from s and parses input like scanf

- char *sentence = "I am a 1337 h4x0r"
- int x;
- sscanf(sentence, "%d", &x);

MP4 usage:

- int x; char post[2];
- sscanf(input, "%d1s", &x, post);

String	X	Post	retval
"ca75"	N/A	N/A	0
"1015"	1015	N/A	1
"5afe"	5	"afe"	2

Lab4 – Rolling Dice

Complete the 'roll_three' function

- Roll 3 dice, each generating a value $\in [1, 6]$

[rand\(\)](#) – returns an integer between 0 and INT_MAX

How to use rand() to output values in required range?

- $\{d1, d2, d3\} = \text{rand()} \% 6 + 1;$

Check to see if any duplicates exists. If so print if either a double or a triple.