### week6

Iommy MacWillian

quiz0 Debrie

Hexadecima

Struct

Enum

Practice Problems

### week6

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### **Announcements**

week6

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quiz0 Debrie

Heyadecim:

04.....

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Liluiii

- great job on quiz0!
- pset4: returned

## Today

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Hexadecima

Struct

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- quiz0 debrief
- hexadecimal
- ▶ file I/O
- structs
- enums

# quiz0

week6

MacWilliar

### quiz0 Debrief

Hexadecima

01.40

Enum

Practice

questions?

### Hexadecimal

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Hexadecimal

Struct

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Practice Problem ▶ binary: base 2, so each digit is  $\times 2^n$ 

- ▶ digits are 0-1
- sometimes written as 0b00101
- ▶ hexadecimal: base 16, so each digit is ×16<sup>n</sup>
  - digits are 0-9 and A-F
  - ▶ usually written as 0x0b39ac

### Hexadecimal

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Hexadecimal

File I/O

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Practice

0x42

$$= 4 \times 16 + 2 \times 1 = 42$$

## Converting to Hexadecimal

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Hexadecimal

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Struct

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- ▶ 8 bits is a byte, 4 bits is a nibble
  - ► HA HA HA COMPUTER JOKES
- 1 nibble = 1 hexadecimal digit
  - because we can represent 4 bits with 16 different digits

## Converting to Hexadecimal

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Hexadecimal

Struct

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Practice

decimal: 40561

binary: 1001111001110001

1	0	0	1	1	1	1	0	0	1	1	1	0	0	0	1
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Hexadecima

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File I/O

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- short for input/output
  - aka reading and writing a file
- file represented by a file pointer, or FILE\*

## **Opening Files**

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File I/O

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Liluini

- FILE\* fp = fopen("/path/to/file.txt", "r");
  - first argument: path to file
  - second argument: mode to open file
    - r: read
    - ▶ w: write (overwrite entire file)
    - a: append (start adding content at end of file)

### Cursor

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File I/O Structs

Enum

. ..

Practice

- each file has an associated cursor: where you are in the file
  - reading/writing bytes will start from the current position of the cursor
  - after reading/writing bytes, cursor will move forward

## Reading

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File I/O

Enum

Practice Problem fgetc: read a single character

fgets: read an entire line into a string

fread: read a specific number of bytes

fscanf: read data in a given format

just like sscanf, except from a file this time

## Writing

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Hexadecim:

File I/O

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- ▶ fputc: write a single character
- fputs: write an entire line from a string
- fwrite: write a sequence of bytes
- fprintf: write data in a given format
  - ▶ just like printf, except to a file this time

### File I/O

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File I/O

Otruc

Fnum

Practice Problem example time!

▶ stringio.c, io.c

### **Structs**

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Structs

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- ▶ as seen in pset4
- container for variables of different types

```
struct x {
   int board[9][9];
   char label;
}
```

## **Typedef**

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Havadacima

пехацесии

Structs

Enum

Practice Problem typedef allows you to create your own types

```
typedef int omginteger;
omginteger n = 5;
printf("%d\n", n);
```

## **Creating Structs**

### week6

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Structs

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Enum

Practice Problems without typedef

```
struct student {
    char* name;
    int score;
};
struct student tommy;
```

## **Creating Structs**

### week6

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Heyadecima

TIEXAGECITIE

Structs

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Enum

Practice Problems with typedef

```
typedef struct student {
    char* name;
    int score;
} student;
student tommy;
```

## **Initializing Structs**

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пехацесии

Structs

Enum

- struct student tommy = { "Tommy", 100 };
  - initialize parameters in the order they appear in the definition
- - initialize parameters in any order you want!

## **Accessing Fields**

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Structs

Enum

Practice

- access fields of structs with . or ->
- used for instances of structs

```
struct student tommy;
tommy.score = 100;
```

-> used for pointers to structs

```
struct* student tommy = malloc(
    sizeof(struct tommy));
tommy->score = 100;
```

## **Structs**

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. ....

Structs

Fnum

Practice Problem example time!

▶ structs.c

### Enums

### week6

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Hexadecima 4 4 1

Struct

Otruc

Enums

Practice Problem #define MOVE\_UP 0
#define MOVE\_RIGHT 1
#define MOVE\_DOWN 2
#define MOVE\_LEFT 3

### **Enums**

#### week6

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Havadacim:

Struct

Enums

```
enum moves = { MOVE_UP, MOVE_RIGHT,
   MOVE_DOWN, MOVE_LEFT };
if (x == MOVE_UP)
   // wow, this makes #define look stupid
```

### **Practice Problems**

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Struc

Enum

- flip a bitmap upside-down
  - rotate a bitmap 90 degrees
- ► implement gedit (poorly)!