Tutorial 12 - 08.02./11.02.21

Group 02/11 - Moritz Makowski - moritz.makowski@tum.de

Revision

Some topics not covered in the tutorial

- Lecture 06 (from slide 11): Syntax Trees
- Lecture 06 (from slide 17): **Control Flow Diagrams**
- Lecture 08 (from slide 25): **Reading C declarations**
- Lecture 08 (from slide 37): Custom type definitions with `typedef`
- Lecture 09 (from slide 41): The preprocessor
- Lecture 10 (from slide 11): **Bitwise operators**
- Lecture 10 (from slide 26): Operator precedence

The **bold** topics are really relevant for the exam.

Today's slides will only include the list of keywords, which we will talk about.

Today's Agenda - 1/2

1. Variables
2. Loops
3. Conditionals
4. Arrays
5. Functions
6. Structs, Enums, Unions

Today's Agenda - 2/2

7. Pointers
8. Dynamic Memory Allocation
9. Lists, Stacks, Queues
10. Trees
11. Sorting
12. Further Topics

1. Variables

- Types of variables
- What is scope?
- What is type casting?

2. Loops

- What types of loops are there?
- When should you use which type?

3. Conditionals

- Two common ways of conditionally executing code?
- Syntax of the two ways

4. Arrays

- What are arrays?
- How to access/manipulate an array
- Multidimensional arrays

5. Functions

- Why should we use functions? (As many reasons as you can think of)
- What happens when we pass parameters to a function?
- Function syntax passing arrays to functions

6. Structs, Enums, Unions

- Why should you use structs?
- Struct syntax

- Why should you use Enums?
- Enum syntax

- Why should you use Unions?
- Union syntax

7. Pointers

- What are pointers?
- What is referencing and dereferencing?
- Syntax of referencing and dereferencing

- Arrays and pointers?
- "Passing by reference" vs. "Passing by value"

8. Dynamic Memory Allocation

- Use cases, where we need dynamic memory allocation
- Basic steps when dynamically allocating memory
- The two allocation-functions and the difference between them
- Syntax of the two functions

9. Lists, Stacks, Queues

- What types of lists are there?
- Benefits and drawbacks of each type?
- *(Bonus)* How may you combine the two types we mainly talked about?

- How does a stack work?
- Find an example in the real world and use case in computer science

- How does a queue work?
- Find an example in the real world and use case in computer science

10. Trees

- Difference between a regular tree and a binary tree
- Prime usecase for binary trees?
- Name the different parts of a tree

- How to implement a tree in C?
- What is binary search?

- Usecase: Syntax Trees

11. Sorting

- How does bubble sort work?
- How does merge sort work?

- Which of the above is more efficient?
- Types of efficiency
- How can we describe efficiency?

12. Further Topics

- Why should we use CFG's?
- How to draw a CFG from code
- How to generate code from a CFG

- Interpret a C declaration

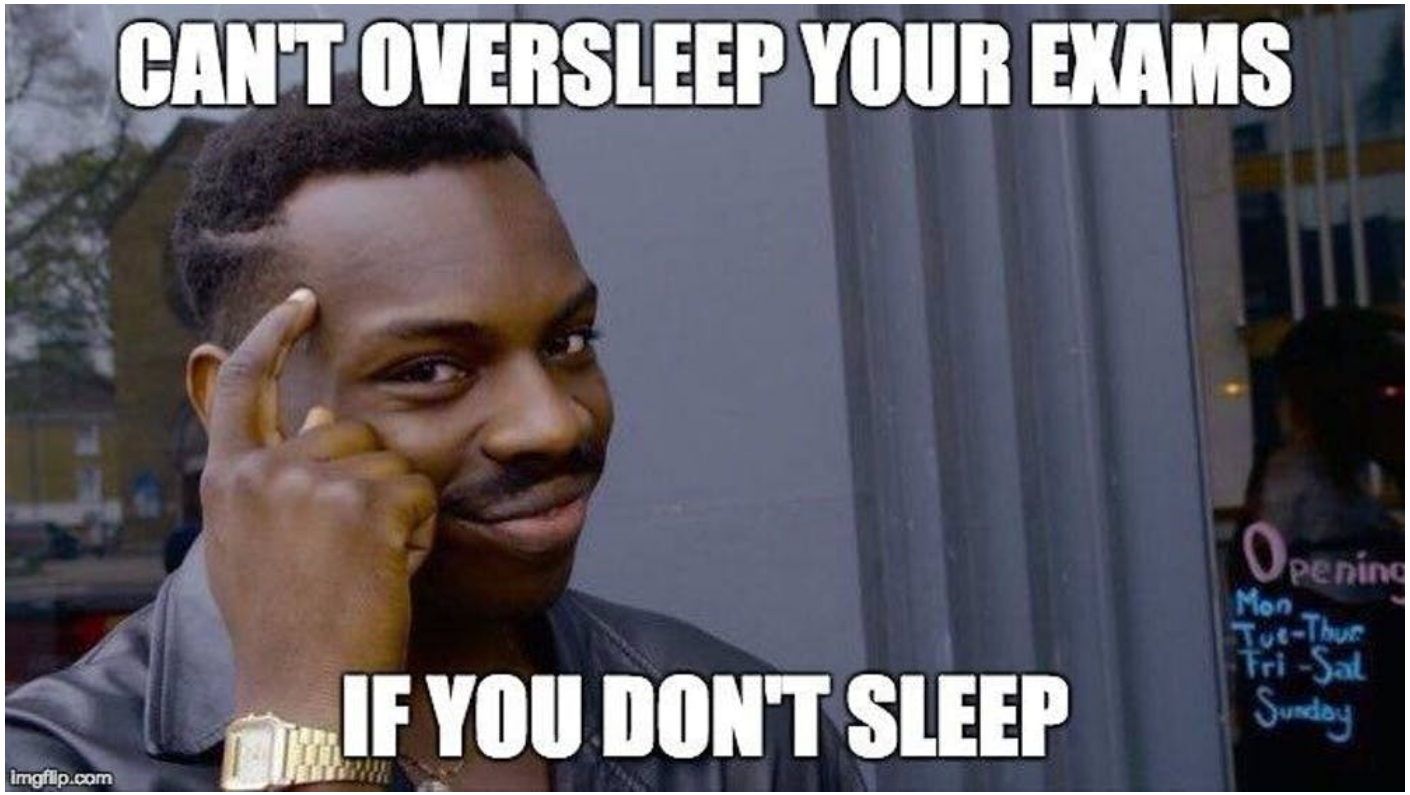
- How do bitwise operators work?
- Why should we use them in some cases?

**CFG = Control Flow Graph*

Good Luck for the Exam!

All **code examples** and **exercise solutions** on **GitLab**:

https://gitlab.lrz.de/dostuffthatmatters/IN8011-WS20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