C Programming

Recitation 8

Outline

- Bitwise Operators
- File Operations

Bitwise Operators

- **Bitwise And (&) operator**

Binary AND Operator copies a bit to the result if it exists in both operands. It applies logical and operation with every bit of operands:

If A is 60 (0011 1100) and B is 13 (0000 1101), then (A & B) is 12 (0000 1100).

- **Bitwise Or (|) operator**

Binary OR Operator copies a bit if it exists in either operand. It applies logical or operation with every bit of operands:

If A is 60 (0011 1100) and B is 13 (0000 1101), then (A | B) is 61 (0011 1101).

Bitwise Operators

- **Bitwise Xor (^) operator**

Binary XOR Operator copies the bit if it is set in one operand but not both. It applies logical xor operation with every bit of operands:

If A is 60 (0011 1100) and B is 13 (0000 1101), then (A ^ B) is 49 (0011 0001).

- **One’s complement (~) operator**

Binary Ones Complement Operator is unary and has the effect of 'flipping' bits.

If A is 60 (0011 1100), then (~A) is -61 (1100 0011).

Bitwise Operators

- **Binary left shift (<<) operator**

The left operands value is moved left by the number of bits specified by the right operand.

If A is 60 (0011 1100), then (A << 2) is 240 (1111 0000).

- **Binary right shift (>>) operator**

The left operands value is moved right by the number of bits specified by the right operand.

If A is 60 (0011 1100), then (A >> 2) is 15 (0000 1111).

Bitwise Operators

Lets see bitwise.c source file to understand these operators.

File Operations

- Open a file:

  FILE *ptr = fopen(“filename.txt”, “r”);

- Open a file, create if not exists:

  FILE *ptr = fopen(“filename.txt”, “w”);

- Close a file:

  fclose(ptr);

- Read information from file or write information to file:

  fscanf(ptr, “%d”, num); // read one integer from file

  fprintf(ptr, “Hello World!”); // write ‘Hello World’ to file

r	Open for reading.	If the file does not exist, fopen() returns NULL.
rb	Open for reading in binary mode.	If the file does not exist, fopen() returns NULL.
w	Open for writing.	If the file exists, its contents are overwritten. If the file does not exist, it will be created.
wb	Open for writing in binary mode.	If the file exists, its contents are overwritten. If the file does not exist, it will be created.
a	Open for append. i.e, Data is added to end of file.	If the file does not exists, it will be created.
ab	Open for append in binary mode. i.e, Data is added to end of file.	If the file does not exists, it will be created.

File Operations

- **fseek(FILE *stream, long int offset, int whence), rewind()**

Change position of cursor in the file. Whence can be SEKK_SET (from start), SEKK_END (from end), SEKK_CUR (from current position).

- **fread(address_data, size_data, number_of_times, pointer_to_file)**

Read binary data from current position.

- **fwrite(address_data, size_data, number_of_times, pointer_to_file)**

Write binary data in file from current position.