# Problem Solving With C - UE24CS151B

## Header Files – Creation and Usage

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# Introduction

- Play a crucial role in **organizing code and promoting reusability**.

- Typically contains **function declarations, macro definitions, structure declarations, and constants** that can be shared across multiple source files.

- This allows developers to separate the **interface** from the **implementation**, leading to cleaner, more modular programs.

# Why use Header files?

- **Code reusability:**

    Write once, use in multiple programs.

- **Improved readability:**

    Keeps the main file clean and focused.

- **Ease of maintenance:**

    Updates made in the header reflect across all included files.

# Creating a Header File

- Create a file with the .h extension (e.g., mathutils.h).

- Write function declarations, macros, or global variables inside.

- Use include guards (#ifndef, #define, #endif) to prevent multiple inclusions.

```
// mathutils.h

#ifndef MATHUTILS_H
#define MATHUTILS_H

int add(int a, int b);
float squareRoot(float x);

#endif
```

# Using a Header File

```c
// main.c

#include <stdio.h>
#include "mathutils.h"

int main() {
    printf("Sum: %d\n", add(5, 3));
    printf("Square root of %d is %f", 25, squareRoot(25));
    return 0;
}
```

# Implementation file

- Define functions in a separate .c file (e.g., mathutils.c)

```
// mathutils.c

#include "mathutils.h"
int add(int a, int b) {
    return a + b;
}
float squareRoot(float x){
    return sqrt(x);
}
```

# Execution Steps

- Compiling  separately into object files:

      gcc -c main.c        // creates main.o
      gcc -c mathutils.c   // creates mathutils.o

- Linking:

      gcc main.o mathutils.o -o myprogram

- Execution:

      ./myprogram     OR     myprogram.exe

# THANK YOU

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