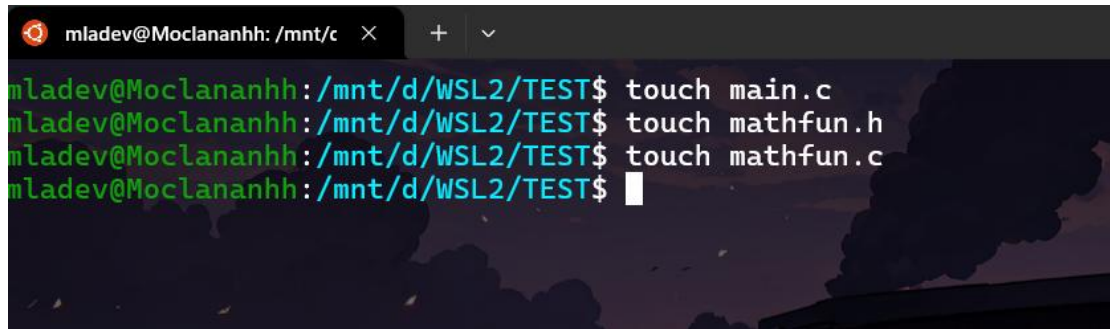


Hands on Library

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Create file

A terminal window with a dark background and a colorful, abstract pattern. The prompt is 'mladev@Moclananh: /mnt/c'. The commands entered are 'touch main.c', 'touch mathfun.h', and 'touch mathfun.c'.

```
mladev@Moclananh: /mnt/c$ touch main.c
mladev@Moclananh: /mnt/c$ touch mathfun.h
mladev@Moclananh: /mnt/c$ touch mathfun.c
mladev@Moclananh: /mnt/c$
```

mathfun.h

```
#ifndef MATHFUN_H
#define MATHFUN_H

int check_prime(int data);
int test_digit(int data);
int test_ascend(int data);
int test_descend(int data);

#endif
```

Mathfun.c

```
#include "mathfun.h"
#include <stdbool.h>

int check_prime(int data)
{
    if (data <= 1)
        return 0; // 1 and below are not prime
    for (int i = 2; i * i <= data; i++)
    {
        if (data % i == 0)
            return 0; // If divisible, not prime
    }
    return 1; // If no divisors found, it's prime
}
```

```

int test_digit(int data)
{
    while (data > 0)
    {
        if (data % 10 == 3)
            return 1; // If any digit is 3, return true
        data /= 10;
    }
    return 0; // If no 3 found, return false
}

```

```

int test_descend(int data)
{
    int last_digit = -1; // Start with -1 as no digit can be smaller
    while (data > 0)
    {
        int current_digit = data % 10;
        if (current_digit < last_digit)
            return 0; // If not descending or equal, return false
        last_digit = current_digit;
        data /= 10;
    }
    return 1; // If all digits were descending or equal, return true
}

```

```

int test_ascend(int data)
{
    int last_digit = 10; // Start with 10 as no digit can be larger
    while (data > 0)
    {
        int current_digit = data % 10;
        if (current_digit > last_digit)
            return 0; // If not ascending or equal, return false
        last_digit = current_digit;
        data /= 10;
    }
    return 1; // If all digits were ascending or equal, return true
}

```

Main.c

```

int main()
{
    printf("Prime numbers between 100 and 1000 that contain the digit 3 and have digits in\nnon-descending or non-ascending order:\n");

    int first = 1;
    for (int i = 100; i <= 1000; i++)
    {
        if (check_prime(i) && test_digit(i) && (test_ascend(i) || test_descend(i)))
        {
            if (!first)
            {
                printf(",");
            }
            printf("%d", i);
            first = 0;
        }
    }
}

```

```
}  
}  
return 0;  
}
```

Compile the lib.c file into a shared library:

```
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch main.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch mathfun.h  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch mathfun.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ gcc -shared -o libmathfun.so mathfun.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$
```

Compile the main.c file and link it with the shared library

```
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch main.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch mathfun.h  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch mathfun.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ gcc -shared -o libmathfun.so mathfun.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ gcc -o program main.c -L. -lmathfun  
mladev@Moclananhh:/mnt/d/WSL2/TEST$
```

Export Loading share library

```
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch main.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch mathfun.h  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ touch mathfun.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ gcc -shared -o libmathfun.so mathfun.c  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ gcc -o program main.c -L. -lmathfun  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ ./program  
./program: error while loading shared libraries: libmathfun.so: cannot open shared object file: No such file or directory  
mladev@Moclananhh:/mnt/d/WSL2/TEST$ export LD_LIBRARY_PATH=$(pwd):$LD_LIBRARY_PATH
```

Run program:

```
mladev@Moclananh: /mnt/d/WSL2/Coding/2.CodeAsm/Assignments/5.HandsOnLibrary$ ./program
Prime numbers between 100 and 1000 that contain the digit 3 and have digits in non-descending or non-ascending
order:
113,137,139,223,233,239,311,331,337,347,349,359,367,379,389,431,433,443,631,643,653,733,743,773,853,863,883,95
3,983mladev@Moclananh: /mnt/d/WSL2/Coding/2.CodeAsm/Assignments/5.HandsOnLibrary$
```