Experiment No: 05

Name of the Experiment: Decimal Input up to 65535 and checking if Prime or not in 8086 assembly Language.

Introduction: This assembly code defines a procedure named CHECK_PRIME aimed at determining whether a number stored in the AX register is a prime number or not. It initializes a divisor counter (CX) to 2, compares the input number with 1 (if it's 1, it immediately declares it as not prime), and then proceeds to check for divisors by iteratively dividing the number by incrementing divisors until reaching the number itself. If a divisor is found without a remainder, it concludes that the number is not prime and displays a message indicating this. Conversely, if no divisors are found, it determines the number is prime and displays a corresponding message. Finally, the procedure concludes by returning. The code uses conditional jumps and interrupts to print messages indicating whether the number is prime or not based on the division results and control flow.

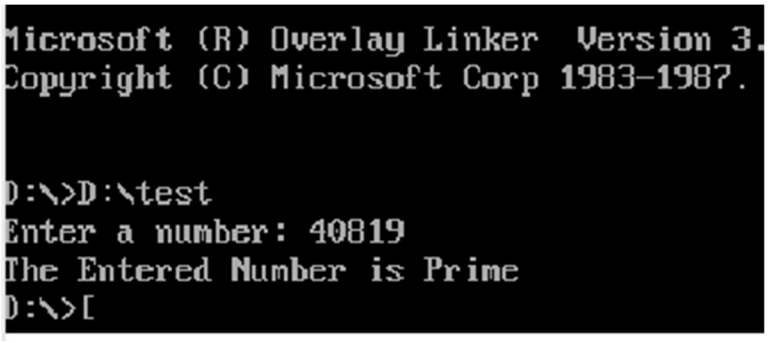
Program:

```
.MODEL SMALL
.STACK 100H
.DATA
    msg1     DB 'Enter a number: $'
    msg2     DB 'The Entered Number is out of 16-bit range$'
    isPrime  DB 'The Entered Number is Prime$'
    notPrime DB 'The Entered Number is not Prime$'
.CODE
INDEC PROC
                PUSH BX
                PUSH CX
                PUSH DX
@BEGIN:
                MOV  AH, 2
                LEA  DX, msg1
                MOV  AH,9
                INT  21h
                XOR  BX, BX
                XOR  CX, CX
                MOV  AH, 1
                INT  21h
                CMP  AL, '-'
                JE   @MINUS
                CMP  AL, '+'
                JE   @PLUS
                JMP  @REPEAT2
@MINUS:
                MOV  CX, 1
@PLUS:
                INT  21h
@REPEAT2:
                CMP  AL, '0'
                JNGE @NOT_DIGIT
```

```
                CMP  AL, '9'
                JNLE @NOT_DIGIT
                AND  AX, 000FH
                PUSH AX
                MOV  AX, 10
                MUL  BX
                POP  BX
                ADD  BX, AX
                MOV  AH, 1
                INT  21h
                CMP  AL, 0DH
                JNE  @REPEAT2
                MOV  AX, BX
                OR   CX, CX
                JE   @EXIT
                NEG  AX
@EXIT:
                POP  DX
                POP  CX
                POP  BX
                RET
@NOT_DIGIT:
                MOV  AH, 2
                MOV  DL, 0DH
                INT  21h
                MOV  DL, 0AH
                INT  21h
                JMP  @BEGIN
INDEC ENDP
CHECK_PRIME PROC
                MOV  CX, 2
                CMP  AX, 1
                JE   @NOT_PRIME
@CHECK_DIVISOR:
                MOV  DX, 0
                MOV  BX, AX
                DIV  CX
                CMP  DX, 0
                JE   @NOT_PRIME
                INC  CX
                MOV  AX, BX
                CMP  CX, AX
                JAE  @IS_PRIME
                JMP  @CHECK_DIVISOR
@IS_PRIME:
                MOV  AH, 9
                LEA  DX, isPrime
                INT  21h
                JMP  @EXIT2
@NOT_PRIME:
                MOV  AH, 9
                LEA  DX, notPrime
                INT  21h
@EXIT2:
                RET
CHECK_PRIME ENDP
MAIN PROC
                MOV  AX, @DATA
                MOV  DS, AX
                CALL INDEC
                CALL CHECK_PRIME
```

```
                MOV  AH, 4CH
                INT  21H
MAIN ENDP
END MAIN
```

Input & Output:



Comments:

1. The entered number should be positive.
2. The entered number should be between 1-65535.