بسم الله الرحمن الرحيم

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Computer Engineering Department
Discrete Mathematics -10636215
HW2

**Deadline: 7/07/2022 midnight** **20 points**

Q1: Write a C function to check if the following statement is true or false.

For every integer $n$>1, the number $n^2+n+41$ is prime.

Hint: this statement is false if you find a counterexample.

Q2: Write a C function to find all positive integers less than n that are divisible by 13 and end with 15 (if any). Your function should take n as a parameter and return an array of those numbers.

**Ex: func(10000) ===> should return array { 715, 2015, 3315, 4615, 5915, 7215, 8515,9815}**

Q3: Write a C function to find a two-digit (positive) integer that becomes 7 times smaller when its first (=leftmost) digit is removed.

Q4. Write C code to encrypt any given integer(msg) using the following encryption algorithm. Please follow the following pseudo code for algorithm:

1. Select any two prime numbers namely p and q.
2. Compute n = p*q
3. Compute m = (p – 1) * (q – 1)
4. Choose e such GCD (e , m ) = 1
5. Calculate d such e*d mod m = 1
6. To encrypt the message, use the following equation:
   Encrypted message(E) = $msg^e$ mod n
7. To decrypt the message, use the following equation:
   msg = $E^d$ mod n

**Example: For p=3 and q=11, and msg= 728750➔ encrypted to 19 and decrypted to 13**

Your code should use the menu to choose the required question.

1. Q1
2. Q2
3. Q3
4. Q4
5. Exit

Good Luck