**ENGIENEERING METHOD PROYECT REPORT**

**Problem identification**

Since the company will improved its security system, cryptography will have a fundamental role in the process, since it is a very secure way to protect data.

In order to implement the cryptography-based security system, they need a software module that generates (n) prime numbers (being ‘n’ the desired amount). Since currently they don’t have any function or program within their system that can perform this task. Prime numbers are needed in order to implement effective encryption algorithms.

The prime numbers must be displayed on the screen, arranged in a matrix.

Functional Requirements

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| --- | --- |
| **Name:** | R. #1 Generate prime numbers. |
| **Description:** | The program must be able to generate (n) prime numbers. It must have three algorithms that can perform this task. |
| Input: | Amount (n) of prime numbers |
|  |  |
| Output: | A table bidimensional with de first (n) prime numbers |
|  |  |

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| --- | --- |
| **Name:** | R. #2 Get input |
| **Description:** | The program must be able to receive the input from the user via a GUI.  This input must be an integer (n) >0 and will be used to generate the prime numbers and create a matrix containing them in order to display them on the screen. |
| Input: | An input (n) that represents the maximum amount of prime numbers that must be generated. |
|  |  |
| Output: | <None> |
|  |  |

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| --- | --- |
| **Name:** | R. #3 Generate Matrix |
| **Description:** | The program must generate a matrix containing all the integers from 0 to (n) where (n) is an input given by the user. |
| Input: | Input (n) |
|  |  |
| Output: | A matrix containing all the numbers from 0 to (n) |
|  |  |

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| --- | --- |
| **Name:** | R. #4 Differeance the primes numbers |
| **Description:** | as the algorithm finds that the number is or is not a prime, that is, that allows to show in real time the process performed by the algorithm to find these prime numbers. |
| Input: | <None> |
|  |  |
| Output: | Green: Prime numbers |
|  | Red: Numbers not prime |

**Relevant information compilation**

Source:

<https://whatis.techtarget.com/definition/prime-number>

<https://crypto.stackexchange.com/questions/20867/why-are-primes-important-for-encryption>

Prime number:

A prime number is a whole number greater than 1 whose only factors are 1 and itself. A factor is a whole number that can be divided evenly into another number. Numbers that have more than two factors are called composite numbers. The number 1 is neither prime nor composite.

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Descripción generada automáticamente

Prime numbers and cryptography:

Encryption always follows a fundamental rule: the algorithm or the actual procedure being used doesn’t need to be kept secret, but the key does. Even the most sophisticated hacker in the world will be unable to decrypt data as long as the key remains secret and prime numbers are very useful for creating keys. For example, the strength of public/private key encryption lies in the fact that it's easy to calculate the product of two randomly chosen prime numbers, but it can be very difficult and time consuming to determine which two prime numbers were used to create an extremely large product, when only the product is known. This problem is called prime factorization and finding an algorithm which does it fast is one of the unsolved problems of computer science.

**Creative Solutions search**

We will tackle the problem of generating prime numbers using different approaches.

In order to display the matrix, and generate the primes.

Alternative 1:

Alternative2:

Alternative3:

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