PDC Project Report

Project Part I:

Newton interpolation (Forward, Backward and Central Difference Method)

Project Part II:

Image Encryption and Decryption Algorithm

Section: BCS-6A

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Project Report

Objective:

The objective of our project is to check the comparison and working of serial and parallel programming of both newton interpolation and encryption algorithms.

Introduction:

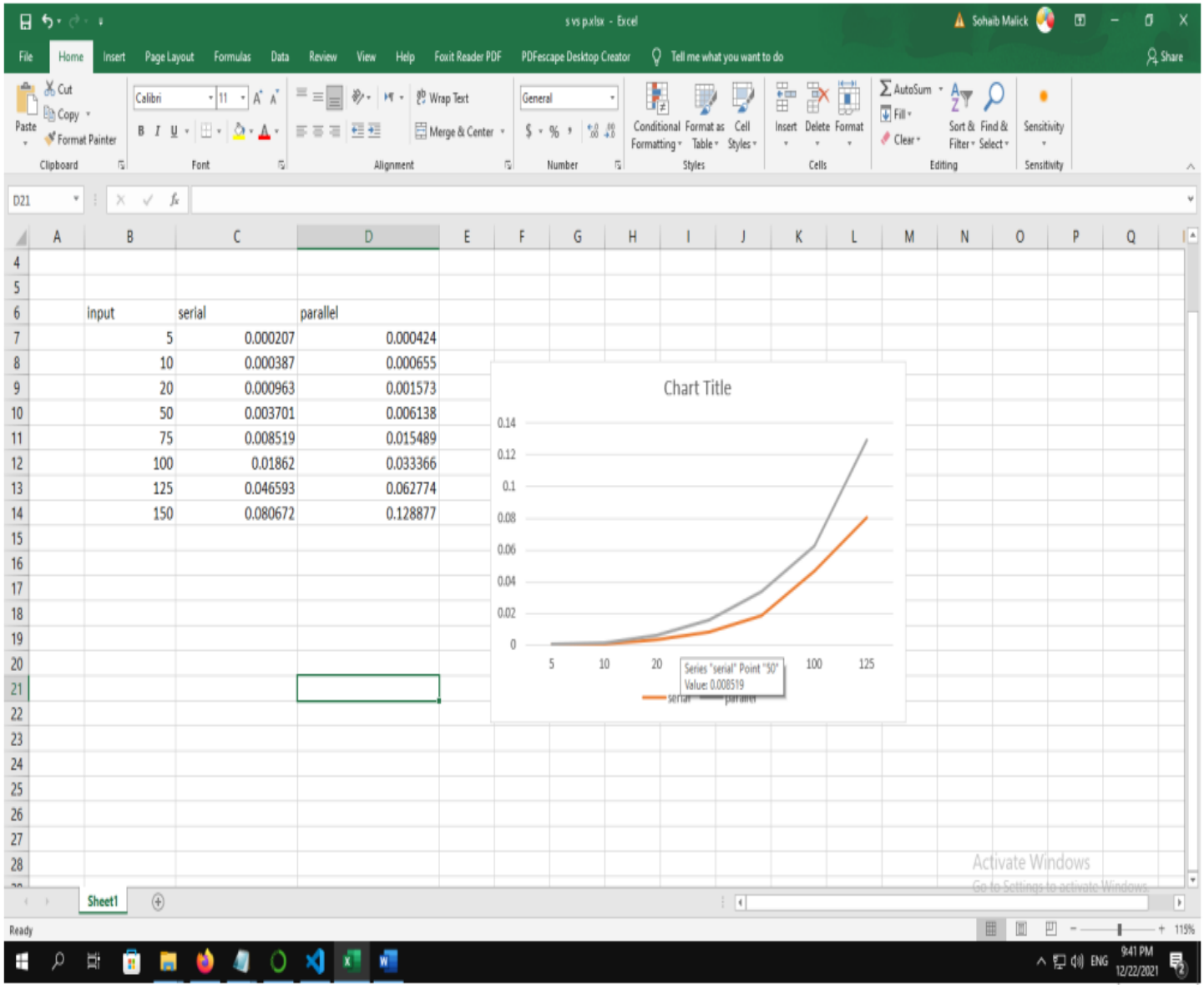
The 2 algorithms we have used to compute serial and parallel are newton difference formula (backward, forward, central) a formula used in numerical computing and a second algorithm which is a secured image encryption algorithm that is processed in parallel .Our system uses RSA algorithm for this purpose. User may submit his image for encryption. Our system now gets the image and converts it into ASCII character format before being encrypted. Then we use RSA algorithm to encrypt the image. Encryption is executed in parallel on multiple threads. Thus, we encrypt images using secure RSA encryption.

Methodology:

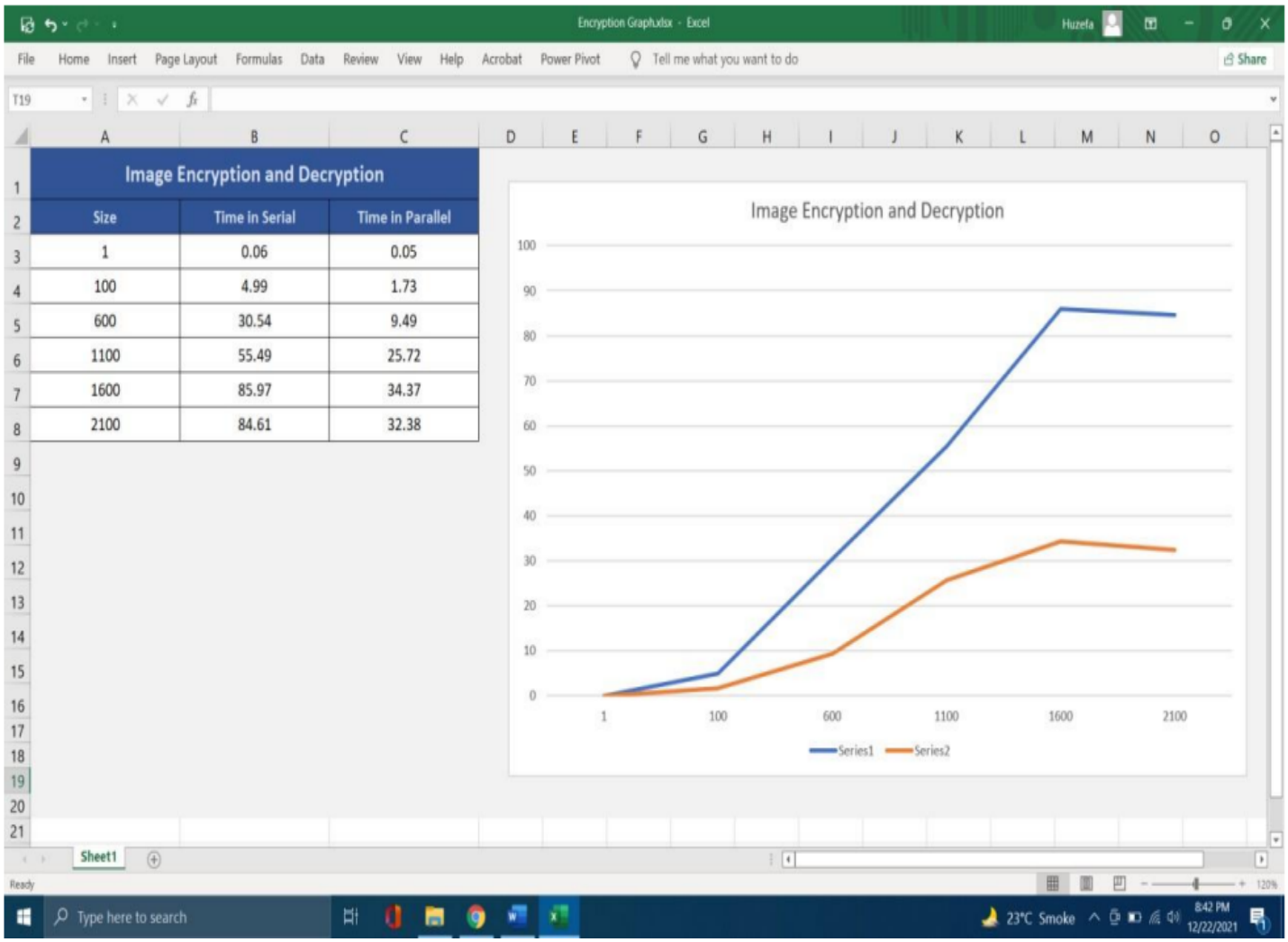
We took help from our 4^{th} semester course Numerical Computing in order to implement the Forward, Backward and Central Difference algorithms. In these algorithms, we enter some number of data on the basis of equal interval of given values. Then we calculate the differences between the two numbers by going in the either forward direction or backward direction depending on the number which is to be find. If it is present on the start of a table, then we apply forward difference formula, otherwise for the last nearest value we use backward difference formula. In order to compute the middle value of the table, so we have to use central difference formula here. The methodology for the second part is based on RSA algorithm and encryption of images in which we read some encrypted and decrypted images , and on the basis of image size we compute both serial and parallel time execution spends in reading of an image. Hence, the methodology behind both the algorithms is that we compute serial and parallel time for the execution of both the algorithms.

Graphs:

Time Graph for Forward Backward and Central Differentiation:



Time Graph for Image Encryption and Decryption:



Applications:

1) Interpolating can turn complicated functions into much simpler ones (like polynomials or trigonometric functions) that are easier to evaluate. This can improve efficiency if the function is to be called many times. Interpolation is also helpful whenever you have to scale things up or down. Maybe you know how much catering costs for an event with 10 people and also 50 people as well as 100 people, but you need an accurate estimate of how much catering will cost for 25 people or 75.

2) Image encryption decryption has applications in internet communication, multimedia systems, medical imaging, telemedicine, military communication. Since, these images may carry highly confidential information, so these images entail extreme protection when users amass somewhere over an unreliable repository.

Conclusion:

The time difference as the input increases as parallel is faster at 100 inputs and continues to be faster for the RSA algorithm also in second algorithm the newton interpolation as the input increases the difference between serial and parallel also decreases.