

Name: _____

İTÜ ID: _____

Signature: _____.

BLG202E – Final Exam Part 1
Spring 2021, Duration: 35 minutes

Instructions:

- Do NOT communicate with other people, including your friends, classmates, and family members!
- This is an open-book exam.
- Give your answers in English. Write your answers as detailed and as clear as possible for each step of calculation.
- Use an A4 paper for each question.
- Write the question number, your Name and İTÜ ID on the top of each page and **sign all pages.**
- Scan or take photo of your answers and upload them on Ninova within a pdf file **before the deadline!**
- **Use last 10 minutes for upload.** There will be no extension for time without penalty. There will be a late submission option for 15 mins where you will lose 3 points for each late minute. **Your latest submission will be considered only.**

Part-1

Write your university ID, for example 11123456789

Q1a (5 points) Write last 9 digits of your university ID in reverse order, for example if your ID is 11123456789, answer will be: 987654321

Q1b (15 points) Create 4 points using the answer for Q1, if your answer was 987654321, points will be (9,8), (7,6), (5,4), (3,2). For these four points calculate the linear interpolation function with using Newton's Form and Divided Differences.

Q1c (5 points) Predict the value of this interpolation function for $x=10$.

Assume you are given an image, which has dimensions from the last 9 digits of your university ID in reverse order. If these digits are 987654321, A will be a 98765 x 4321 image. Each pixel requires 8 bits.

Q2a (5 points) What is the space required to save this image in bytes.

We want to reduce the space required to save this image by SVD. What will be the space required if you use;

Q2b (10 points) mode-10 (rank-10) SVD approximation

Q2c (10 points) mode-100 (rank-100) SVD approximation