**Advanced Algorithms**

**Exercise for Lecture 14**

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| **Student Name** |  | **Student ID** |  |
| **Problem 1** |  | | |
| **Problem 2** |  | | |
| **Problem 3** |  | | |
| **Total Score** |  | | |
| **Notes** | Deadline: **2023-11-12 24:00**  Submission Format: ‘**Lecture14\_Name\_Student ID.docx**’, and please send to: **[algorithms\_23fall@163.com](mailto:algorithms_23fall@163.com)**.  This assignment is meant to be an evaluation of your **individual** understanding coming into the course and should be completed **without collaboration** or outside help. | | |

**Problem 1. [30 points]** Suppose that you want to multiply the two polynomials and using the DFT. Choose an appropriate power of two, find the DFT of the two sequences, multiply the results component-wise, and compute the inverse DFT to get the final result. (Hint: , where the entry of is ).

**Solution:**

**Problem 2. [30 points]** Show how FFT computes the DFT of the vector .

**Solution:**

**Problem 3. [40 points]** Show how FFT computes the DFT of the vector .

**Solution:**