Task 1:

% Problem 1 (DFT implementation):

%clc; % clean the screen

clear; % clear the memory

% create an arbitary vector

t = 0:1:1000;

y = t;

% Call the function

tic;

profile on;

Result1=funcDFT(y);

profile viewer

toc;

% Comparison with fft

tic;

Result2=fft(y);

toc;

The function funcDFT:

function [ output ] = funcDFT( y )

%UNTITLED Summary of this function goes here

% Detailed explanation goes here

y1=ones(length(y),1);

y2=(y1\*y)';

N=length(y);

n=[0:N-1];

k=[0:N-1]';

% The result is a 2D array such that

% the columns vary as k varies and rows vary as n varies

h=exp(-i\*k\*n\*2\*pi/N);

% Multiply each element in y2 by each element in h

answer=y2.\*h;

% We take the sum in row direction ( n direction)

output=sum(answer,1);

% output=sum(answer,2) gives the sum in column direction ( k direction)

end

Elapsed time is 0.217952 seconds.

Elapsed time is 0.000055 seconds.

