ROLES AND RESPONSIBILITIES

- Discretized 1D convection equation using finite different scheme to obtain algebraic equation to solve through matlab

- Developed code to solve 1D Convection equation using matlab and plotted velocity at different points across different grid points

- Studied the effect of time step on numerical diffusion of solution of 1D convection equation

CODE SNIPPETS AND RESULTS

```
clear all;
close all;
clc;
L=1;
n=31;
c=1;
nt=40;
dt = 1e-4;
x=linspace(0,L,n);
dx=x(2)-x(1);
u=ones(1,n);
nstart = 4;
nstop = 10;
u(nstart:nstop) = 2;
uold=u;
uinitial=u;
for k=1:nt
for i=2:n
u(i)=uold(i)-(c*dt/dx)*(uold(i)-uold(i-1)).
end
uold=u;
plot(x,uinitial,'r');
hold on;
plot (x,uold,'b');
pause(0.3)
xlabel('Node points');
ylabel('velocity');
```


Numerical solutionn of velocity profile

Numerical solutionn of velocity profile at dt=1e-1

Numerical solutionn of velocity profile at dt=1e-2

Numerical solutionn of velocity profile at dt=1e-3

Numerical solutionn of velocity profile at dt=1e-4

Time step Vs solution time graph