Problem 2 Sum_up Sheng Xu

	Discontinuous	C ⁰	C∞
FSCT	Unstable	Unstable	Unstable
	05 0 03 02 03 04 05 08 07 0B 09 1	2 0 01 02 03 04 05 08 07 08 09 1	10"
1 st Upwind	Stable with dissipation	Stable with dissipation	Stable
CFL	0.5 0.4 0.4 0.3 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	09 00 00 00 00 00 00 00 00 00 00 00 00 0	08 04 02 03 04 05 08 07 08 09 1
1 st Upwind	Unstable	Unstable	Unstable
non-CFL	8 6 6 7 08 09 1	0.01 52 03 04 05 98 07 09 09 1	108
Crank-Nich	Stable with Dispersion	Stable with dissipation	Stable
olson	0.5 0.1 0.2 0.3 0.4 0.5 0.8 0.7 0.8 0.9	09 00 00 00 04 03 00 00 01 02 03 04 05 06 06 07 08 08 07 08 09 08 08 08 08 08 08 08 08 08 08 08 08 08	08 06 04 05 08 07 08 09 1
BSCT	Stable with Dispersion	Stable with Dispersion	Stable
	05 04 03 04 05 06 07 00 09	030 000 000 000 000 000 000 000 000 000	08 04 05 08 07 08 09 1

Functions	Discontinuous		Co		C [∞]
	F=0	when -1≤ x <-0.5	F=2x+2	when x≤ -0.5	cos(3x)
		0≤ x < 0.5	F=-2x	when -0.5≤x<0	
	F=0.5	when -0.5≤ x < 0	F=2x	when 0≤x<0.5	
		0.5≤x<1	F=2-2x	when 0.5≤ x≤1	

Conclusion:

All stable methods exhibit certain dissipation with C^{∞} functions. FSCT and First Order Upwind method without CFL are never stable.

For Discontinuity and C^1 functions, both implicit methods(C-N and BSCT) exhibits dispersion, making pictures less smooth. BSCT is more effected in C^1 function, while C-N is more effected in Discontinuity function.