Find numerical (the first scheme against the flow) solutions of one-dimensional transport equation

$$\frac{\partial u}{\partial t} + c\frac{\partial u}{\partial x} = 0; x \in (0,1), t > 0$$

with the following conditions:

$c = 1;$

1. $u(t = 0, x) = \cos(\frac{\pi x}{2});$

    $u(t, x = 0) = 1, \quad u(t, x = 1) = 0.$

$c = -1;$

2. $u(t = 0, x) = \cos(\frac{\pi x}{2});$

    $u(t, x = 0) = 1, \quad u(t, x = 1) = 0.$

$c = 0.5;$

3. $u(t = 0, x) = x;$

    $u(t, x = 0) = 0, \quad u(t, x = 1) = 1.$

$c = 1;$

4. $u(t = 0, x) = 0;$

    $u(t, x = 0) = 1, \quad u_x(t, x = 1) = 0.$

$c = -1;$

5. $u(t = 0, x) = x + 1;$

    $u(t, x = 0) = 1, \quad u(t, x = 1) = 2.$

$c = 1;$

6. $u(t = 0, x) = 0;$

    $u(t, x = 0) = 1, \quad u(t, x = 1) = 3.$

$c = -1;$

7. $u(t = 0, x) = 0;$

    $u_x(t, x = 0) = 0, \quad u(t, x = 1) = 1.$

$c = 2;$

8. $u(t = 0, x) = \cos(\frac{\pi x}{2});$

    $u(t, x = 0) = 1, \quad u(t, x = 1) = 0.$

$c = -0.5;$

9. $u(t = 0, x) = 1 - x;$

   $u(t, x = 0) = 1, \quad u(t, x = 1) = 0.$

$c = -1;$

10. $u(t = 0, x) = x + 1;$

   $u_x(t, x = 0) = 1, \quad u(t, x = 1) = 2.$

$c = 1;$

11. $u(t = 0, x) = 0;$

   $u(t, x = 0) = 1, \quad u(t, x = 1) = 0.$

$c = -2;$

12. $u(t = 0, x) = x + 1;$

   $u(t, x = 0) = 1, \quad u(t, x = 1) = 2.$

$c = 1;$

13. $u(t = 0, x) = \cos(\dfrac{\pi x}{2});$

   $u(t, x = 0) = 1, \quad u_x(t, x = 1) = 0.$

$c = -1;$

14. $u(t = 0, x) = x;$

   $u(t, x = 0) = 0, \quad u(t, x = 1) = 1.$

$c = 1;$

15. $u(t = 0, x) = 1;$

   $u(t, x = 0) = 2, \quad u(t, x = 1) = 1.$

$c = 1;$

16. $u(t = 0, x) = \cos(\dfrac{\pi x}{2});$

   $u(t, x = 0) = 1, \quad u_x(t, x = 1) = 1.$

$c = 1;$

17. $u(t = 0, x) = 0;$

   $u(t, x = 0) = 1, \quad u(t, x = 1) = 2.$

$c = -1.5;$

18. $u(t = 0, x) = 0;$

   $u(t, x = 0) = 1, \quad u(t, x = 1) = 0.$

$$c = 1;$$

19. $u(t = 0, x) = \sin(\pi x);$

$$u(t, x = 0) = 0, \quad u(t, x = 1) = 0.$$

$$c = -1;$$

20. $u(t = 0, x) = 0.5;$

$$u(t, x = 0) = 0.5, \quad u(t, x = 1) = 0.$$

Draw graphs for different three time moments. Do not forget to demonstrate stability condition.