1. Consider a IIR filter with system function

$$H(z) = \frac{1 + (1/2)Z^{-1} - (1/3)Z^{-2}}{1 - 2\,Z^{-2}}$$

Sketch the direct form-I and direct form-II realizations of the filter

2. Starting from the basic equation for filters show how to realize IIR filter in Direct form-II.
3. Derive lattice structure for realization of FIR system.
4. A LTI system is described by the following input- output relation
   $2y(n)-y(n-2)-4y(n-3)=3x(n-2)$. Realize the system in DF-I and DF-II
5. Consider a FIR filter with system function $H(z) = 1 + 2.88z-1 + 3.4048z-2 + 1.74z-3 + 0.4z-4$ Sketch the direct form and lattice realizations of the filter and determine in detail the corresponding input - output equations.(Any equation defining filter can be given)
6. Realize the FIR filter given by $h(n)=(\frac{1}{2})^n[u(n)-u(n-4)]$ using direct form I   6m
7. Obtain the Direct form I, II and cascade realization of the following system

$Y(n)= 0.75y(n-1)-0.125y(n-2)+6x(n)+7x(n-1)+x(n-2)$.(Any equation defining filter can be given)

8. Obtain the direct form realization of the linear phase FIR filter given by
   $1+2/3Z^{-1}+15/8Z^{-2}$

9. Let the coefficients of a 3 stage FIR filter lattice structure be $k_1=0.1$, $k_2=0.2$, $k_3=0.3$. Find the coefficients of the direct form I FIR filter and draw its block diagram. .(K1,K2,K3 can be of any value)

10. Determine the coefficients K_m of the lattice filter corresponding to FIR filter described by the system function $H(Z)= 1+2Z^{-1}+1/3Z^{-2}$. Also draw the corresponding second order lattice structure.(Can be of any system H(Z))

11. Given the FIR filter with the following difference equation $y(n)=x(n)+3.1x(n-1)+5.5x(n-2)+4.2x(n-3)+2.3x(n-4)$. Sketch the lattice realization of the filter. (Any difference equation is possible)