\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*INITIAL TREE\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

XO= 0 :

| XM= 0 :

| | XF= 0 :

| | | XB= 0 :

| | | | XG= 0 : 0

| | | | XG= 1 :

| | | | | XD= 0 :

| | | | | | XS= 0 : 0

| | | | | | XS= 1 :

| | | | | | | XC= 0 : 1

| | | | | | | XC= 1 :

| | | | | | | | XH= 0 : 0

| | | | | | | | XH= 1 : 1

| | | | | XD= 1 :

| | | | | | XP= 0 :

| | | | | | | XE= 0 : 0

| | | | | | | XE= 1 : 1

| | | | | | XP= 1 : 0

| | | XB= 1 :

| | | | XD= 0 : 0

| | | | XD= 1 :

| | | | | XI= 0 : 0

| | | | | XI= 1 :

| | | | | | XN= 0 : 0

| | | | | | XN= 1 : 1

| | XF= 1 : 0

| XM= 1 :

| | XB= 0 :

| | | XF= 0 :

| | | | XG= 0 : 0

| | | | XG= 1 :

| | | | | XD= 0 : 1

| | | | | XD= 1 :

| | | | | | XC= 0 :

| | | | | | | XS= 0 : 0

| | | | | | | XS= 1 :

| | | | | | | | XR= 0 : 1

| | | | | | | | XR= 1 : 0

| | | | | | XC= 1 : 0

| | | XF= 1 :

| | | | XS= 0 :

| | | | | XQ= 0 :

| | | | | | XI= 0 : 0

| | | | | | XI= 1 :

| | | | | | | XP= 0 : 0

| | | | | | | XP= 1 : 1

| | | | | XQ= 1 :

| | | | | | XI= 0 : 1

| | | | | | XI= 1 :

| | | | | | | XL= 0 : 1

| | | | | | | XL= 1 :

| | | | | | | | XT= 0 : 0

| | | | | | | | XT= 1 : 1

| | | | XS= 1 :

| | | | | XR= 0 :

| | | | | | XD= 0 : 1

| | | | | | XD= 1 :

| | | | | | | XP= 0 :

| | | | | | | | XT= 0 :

| | | | | | | | | XQ= 0 : 0

| | | | | | | | | XQ= 1 : 1

| | | | | | | | XT= 1 : 1

| | | | | | | XP= 1 : 0

| | | | | XR= 1 :

| | | | | | XI= 0 :

| | | | | | | XU= 0 : 1

| | | | | | | XU= 1 : 0

| | | | | | XI= 1 :

| | | | | | | XG= 0 :

| | | | | | | | XQ= 0 :

| | | | | | | | | XJ= 0 :

| | | | | | | | | | XU= 0 : 1

| | | | | | | | | | XU= 1 : 0

| | | | | | | | | XJ= 1 : 1

| | | | | | | | XQ= 1 : 0

| | | | | | | XG= 1 : 1

| | XB= 1 :

| | | XI= 0 : 0

| | | XI= 1 :

| | | | XK= 0 :

| | | | | XD= 0 : 0

| | | | | XD= 1 :

| | | | | | XP= 0 : 1

| | | | | | XP= 1 :

| | | | | | | XS= 0 :

| | | | | | | | XG= 0 : 1

| | | | | | | | XG= 1 :

| | | | | | | | | XN= 0 : 0

| | | | | | | | | XN= 1 : 1

| | | | | | | XS= 1 : 0

| | | | XK= 1 : 0

XO= 1 :

| XI= 0 :

| | XM= 0 :

| | | XQ= 0 :

| | | | XF= 0 :

| | | | | XH= 0 :

| | | | | | XS= 0 : 0

| | | | | | XS= 1 :

| | | | | | | XP= 0 : 0

| | | | | | | XP= 1 : 1

| | | | | XH= 1 : 1

| | | | XF= 1 : 0

| | | XQ= 1 :

| | | | XJ= 0 :

| | | | | XN= 0 :

| | | | | | XP= 0 : 1

| | | | | | XP= 1 :

| | | | | | | XU= 0 : 0

| | | | | | | XU= 1 :

| | | | | | | | XF= 0 : 0

| | | | | | | | XF= 1 : 1

| | | | | XN= 1 : 0

| | | | XJ= 1 :

| | | | | XL= 0 :

| | | | | | XH= 0 : 0

| | | | | | XH= 1 :

| | | | | | | XU= 0 : 1

| | | | | | | XU= 1 :

| | | | | | | | XK= 0 : 0

| | | | | | | | XK= 1 : 1

| | | | | XL= 1 : 1

| | XM= 1 :

| | | XQ= 0 :

| | | | XF= 0 :

| | | | | XL= 0 :

| | | | | | XC= 0 : 1

| | | | | | XC= 1 :

| | | | | | | XH= 0 : 1

| | | | | | | XH= 1 :

| | | | | | | | XU= 0 :

| | | | | | | | | XR= 0 :

| | | | | | | | | | XT= 0 : 0

| | | | | | | | | | XT= 1 : 1

| | | | | | | | | XR= 1 : 0

| | | | | | | | XU= 1 : 1

| | | | | XL= 1 :

| | | | | | XP= 0 : 0

| | | | | | XP= 1 :

| | | | | | | XT= 0 : 1

| | | | | | | XT= 1 :

| | | | | | | | XJ= 0 : 1

| | | | | | | | XJ= 1 : 0

| | | | XF= 1 : 0

| | | XQ= 1 : 0

| XI= 1 :

| | XT= 0 :

| | | XH= 0 :

| | | | XP= 0 :

| | | | | XF= 0 : 0

| | | | | XF= 1 :

| | | | | | XR= 0 :

| | | | | | | XL= 0 :

| | | | | | | | XU= 0 : 0

| | | | | | | | XU= 1 : 1

| | | | | | | XL= 1 : 1

| | | | | | XR= 1 :

| | | | | | | XQ= 0 : 1

| | | | | | | XQ= 1 : 0

| | | | XP= 1 :

| | | | | XS= 0 :

| | | | | | XD= 0 :

| | | | | | | XC= 0 :

| | | | | | | | XU= 0 :

| | | | | | | | | XQ= 0 : 1

| | | | | | | | | XQ= 1 : 0

| | | | | | | | XU= 1 :

| | | | | | | | | XG= 0 : 1

| | | | | | | | | XG= 1 : 0

| | | | | | | XC= 1 : 0

| | | | | | XD= 1 :

| | | | | | | XM= 0 :

| | | | | | | | XJ= 0 : 0

| | | | | | | | XJ= 1 : 1

| | | | | | | XM= 1 : 1

| | | | | XS= 1 : 1

| | | XH= 1 :

| | | | XJ= 0 :

| | | | | XC= 0 :

| | | | | | XN= 0 : 1

| | | | | | XN= 1 :

| | | | | | | XG= 0 :

| | | | | | | | XF= 0 : 1

| | | | | | | | XF= 1 : 0

| | | | | | | XG= 1 : 0

| | | | | XC= 1 :

| | | | | | XM= 0 : 0

| | | | | | XM= 1 :

| | | | | | | XS= 0 :

| | | | | | | | XR= 0 : 1

| | | | | | | | XR= 1 : 0

| | | | | | | XS= 1 : 1

| | | | XJ= 1 :

| | | | | XS= 0 : 1

| | | | | XS= 1 :

| | | | | | XG= 0 :

| | | | | | | XB= 0 : 0

| | | | | | | XB= 1 :

| | | | | | | | XN= 0 : 1

| | | | | | | | XN= 1 :

| | | | | | | | | XU= 0 : 1

| | | | | | | | | XU= 1 : 0

| | | | | | XG= 1 :

| | | | | | | XQ= 0 : 1

| | | | | | | XQ= 1 :

| | | | | | | | XU= 0 : 1

| | | | | | | | XU= 1 : 0

| | XT= 1 :

| | | XS= 0 :

| | | | XQ= 0 :

| | | | | XK= 0 :

| | | | | | XC= 0 :

| | | | | | | XR= 0 :

| | | | | | | | XH= 0 :

| | | | | | | | | XE= 0 : 0

| | | | | | | | | XE= 1 : 1

| | | | | | | | XH= 1 : 1

| | | | | | | XR= 1 :

| | | | | | | | XU= 0 : 0

| | | | | | | | XU= 1 :

| | | | | | | | | XL= 0 : 0

| | | | | | | | | XL= 1 : 1

| | | | | | XC= 1 : 1

| | | | | XK= 1 :

| | | | | | XD= 0 :

| | | | | | | XJ= 0 : 0

| | | | | | | XJ= 1 : 1

| | | | | | XD= 1 : 0

| | | | XQ= 1 :

| | | | | XM= 0 :

| | | | | | XN= 0 :

| | | | | | | XU= 0 : 1

| | | | | | | XU= 1 : 0

| | | | | | XN= 1 :

| | | | | | | XR= 0 : 1

| | | | | | | XR= 1 :

| | | | | | | | XL= 0 : 1

| | | | | | | | XL= 1 : 0

| | | | | XM= 1 : 0

| | | XS= 1 :

| | | | XL= 0 :

| | | | | XD= 0 :

| | | | | | XU= 0 : 1

| | | | | | XU= 1 :

| | | | | | | XQ= 0 :

| | | | | | | | XG= 0 : 1

| | | | | | | | XG= 1 : 0

| | | | | | | XQ= 1 :

| | | | | | | | XH= 0 : 0

| | | | | | | | XH= 1 : 1

| | | | | XD= 1 :

| | | | | | XG= 0 : 0

| | | | | | XG= 1 : 1

| | | | XL= 1 :

| | | | | XH= 0 :

| | | | | | XQ= 0 :

| | | | | | | XD= 0 : 0

| | | | | | | XD= 1 :

| | | | | | | | XR= 0 : 0

| | | | | | | | XR= 1 : 1

| | | | | | XQ= 1 :

| | | | | | | XM= 0 : 1

| | | | | | | XM= 1 : 0

| | | | | XH= 1 : 0

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*RANDOM TREE\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

XE= 0 :

| XI= 0 :

| | XD= 0 :

| | | XT= 0 :

| | | | XN= 0 :

| | | | | XD= 0 : 0

| | | | | XD= 1 : 0

| | | | XN= 1 :

| | | | | XG= 0 :

| | | | | | XK= 0 :

| | | | | | | XH= 0 : 0

| | | | | | | XH= 1 : 1

| | | | | | XK= 1 :

| | | | | | | XQ= 0 : 0

| | | | | | | XQ= 1 :

| | | | | | | | XC= 0 : 0

| | | | | | | | XC= 1 :

| | | | | | | | | XD= 0 : 0

| | | | | | | | | XD= 1 : 0

| | | | | XG= 1 :

| | | | | | XD= 0 : 0

| | | | | | XD= 1 : 0

| | | XT= 1 :

| | | | XM= 0 :

| | | | | XB= 0 :

| | | | | | XM= 0 : 0

| | | | | | XM= 1 : 0

| | | | | XB= 1 :

| | | | | | XN= 0 :

| | | | | | | XM= 0 : 0

| | | | | | | XM= 1 : 0

| | | | | | XN= 1 : 0

| | | | XM= 1 :

| | | | | XB= 0 :

| | | | | | XD= 0 : 0

| | | | | | XD= 1 : 0

| | | | | XB= 1 : 0

| | XD= 1 :

| | | XI= 0 : 0

| | | XI= 1 : 0

| XI= 1 :

| | XS= 0 :

| | | XM= 0 :

| | | | XJ= 0 :

| | | | | XD= 0 :

| | | | | | XP= 0 : 0

| | | | | | XP= 1 :

| | | | | | | XO= 0 : 0

| | | | | | | XO= 1 : 0

| | | | | XD= 1 :

| | | | | | XR= 0 :

| | | | | | | XJ= 0 : 0

| | | | | | | XJ= 1 : 0

| | | | | | XR= 1 :

| | | | | | | XS= 0 : 0

| | | | | | | XS= 1 : 0

| | | | XJ= 1 :

| | | | | XR= 0 :

| | | | | | XE= 0 : 0

| | | | | | XE= 1 : 0

| | | | | XR= 1 :

| | | | | | XN= 0 : 0

| | | | | | XN= 1 :

| | | | | | | XI= 0 : 0

| | | | | | | XI= 1 : 0

| | | XM= 1 :

| | | | XU= 0 :

| | | | | XB= 0 :

| | | | | | XG= 0 :

| | | | | | | XM= 0 : 0

| | | | | | | XM= 1 : 0

| | | | | | XG= 1 :

| | | | | | | XH= 0 : 1

| | | | | | | XH= 1 :

| | | | | | | | XQ= 0 : 1

| | | | | | | | XQ= 1 :

| | | | | | | | | XK= 0 : 0

| | | | | | | | | XK= 1 : 1

| | | | | XB= 1 :

| | | | | | XK= 0 :

| | | | | | | XG= 0 : 1

| | | | | | | XG= 1 :

| | | | | | | | XC= 0 :

| | | | | | | | | XU= 0 : 0

| | | | | | | | | XU= 1 : 0

| | | | | | | | XC= 1 :

| | | | | | | | | XU= 0 : 0

| | | | | | | | | XU= 1 : 0

| | | | | | XK= 1 :

| | | | | | | XJ= 0 : 0

| | | | | | | XJ= 1 :

| | | | | | | | XJ= 0 : 0

| | | | | | | | XJ= 1 : 0

| | | | XU= 1 :

| | | | | XH= 0 :

| | | | | | XQ= 0 :

| | | | | | | XH= 0 : 0

| | | | | | | XH= 1 : 0

| | | | | | XQ= 1 :

| | | | | | | XM= 0 : 0

| | | | | | | XM= 1 : 0

| | | | | XH= 1 :

| | | | | | XP= 0 :

| | | | | | | XU= 0 : 0

| | | | | | | XU= 1 : 0

| | | | | | XP= 1 :

| | | | | | | XT= 0 : 1

| | | | | | | XT= 1 :

| | | | | | | | XB= 0 :

| | | | | | | | | XM= 0 : 0

| | | | | | | | | XM= 1 : 0

| | | | | | | | XB= 1 : 1

| | XS= 1 :

| | | XN= 0 :

| | | | XJ= 0 :

| | | | | XR= 0 :

| | | | | | XB= 0 : 1

| | | | | | XB= 1 :

| | | | | | | XL= 0 :

| | | | | | | | XG= 0 :

| | | | | | | | | XH= 0 : 0

| | | | | | | | | XH= 1 :

| | | | | | | | | | XH= 0 : 0

| | | | | | | | | | XH= 1 : 0

| | | | | | | | XG= 1 : 0

| | | | | | | XL= 1 : 1

| | | | | XR= 1 :

| | | | | | XH= 0 :

| | | | | | | XE= 0 : 0

| | | | | | | XE= 1 : 0

| | | | | | XH= 1 :

| | | | | | | XO= 0 : 0

| | | | | | | XO= 1 : 0

| | | | XJ= 1 :

| | | | | XD= 0 :

| | | | | | XB= 0 :

| | | | | | | XS= 0 : 0

| | | | | | | XS= 1 : 0

| | | | | | XB= 1 :

| | | | | | | XG= 0 :

| | | | | | | | XM= 0 :

| | | | | | | | | XR= 0 : 0

| | | | | | | | | XR= 1 : 1

| | | | | | | | XM= 1 :

| | | | | | | | | XP= 0 : 1

| | | | | | | | | XP= 1 :

| | | | | | | | | | XF= 0 :

| | | | | | | | | | | XN= 0 : 0

| | | | | | | | | | | XN= 1 : 0

| | | | | | | | | | XF= 1 : 0

| | | | | | | XG= 1 :

| | | | | | | | XO= 0 : 0

| | | | | | | | XO= 1 : 0

| | | | | XD= 1 :

| | | | | | XT= 0 :

| | | | | | | XS= 0 : 0

| | | | | | | XS= 1 : 0

| | | | | | XT= 1 :

| | | | | | | XS= 0 : 0

| | | | | | | XS= 1 : 0

| | | XN= 1 :

| | | | XR= 0 :

| | | | | XR= 0 : 0

| | | | | XR= 1 : 0

| | | | XR= 1 :

| | | | | XR= 0 : 0

| | | | | XR= 1 : 0

XE= 1 :

| XP= 0 :

| | XK= 0 :

| | | XN= 0 :

| | | | XN= 0 : 0

| | | | XN= 1 : 0

| | | XN= 1 :

| | | | XM= 0 :

| | | | | XI= 0 :

| | | | | | XQ= 0 :

| | | | | | | XD= 0 :

| | | | | | | | XI= 0 : 0

| | | | | | | | XI= 1 : 0

| | | | | | | XD= 1 : 0

| | | | | | XQ= 1 :

| | | | | | | XE= 0 : 0

| | | | | | | XE= 1 : 0

| | | | | XI= 1 :

| | | | | | XQ= 0 : 1

| | | | | | XQ= 1 : 0

| | | | XM= 1 :

| | | | | XJ= 0 :

| | | | | | XS= 0 : 1

| | | | | | XS= 1 :

| | | | | | | XK= 0 : 0

| | | | | | | XK= 1 : 0

| | | | | XJ= 1 :

| | | | | | XT= 0 :

| | | | | | | XE= 0 : 0

| | | | | | | XE= 1 : 0

| | | | | | XT= 1 :

| | | | | | | XB= 0 :

| | | | | | | | XU= 0 :

| | | | | | | | | XN= 0 : 0

| | | | | | | | | XN= 1 : 0

| | | | | | | | XU= 1 : 1

| | | | | | | XB= 1 : 0

| | XK= 1 :

| | | XR= 0 :

| | | | XM= 0 :

| | | | | XM= 0 : 0

| | | | | XM= 1 : 0

| | | | XM= 1 :

| | | | | XE= 0 : 0

| | | | | XE= 1 : 0

| | | XR= 1 :

| | | | XG= 0 :

| | | | | XI= 0 :

| | | | | | XS= 0 : 1

| | | | | | XS= 1 : 0

| | | | | XI= 1 :

| | | | | | XC= 0 :

| | | | | | | XU= 0 :

| | | | | | | | XC= 0 : 0

| | | | | | | | XC= 1 : 0

| | | | | | | XU= 1 : 0

| | | | | | XC= 1 : 0

| | | | XG= 1 :

| | | | | XC= 0 : 0

| | | | | XC= 1 :

| | | | | | XB= 0 :

| | | | | | | XL= 0 :

| | | | | | | | XC= 0 : 0

| | | | | | | | XC= 1 : 0

| | | | | | | XL= 1 :

| | | | | | | | XP= 0 : 0

| | | | | | | | XP= 1 : 0

| | | | | | XB= 1 : 0

| XP= 1 :

| | XG= 0 :

| | | XD= 0 :

| | | | XJ= 0 :

| | | | | XF= 0 :

| | | | | | XB= 0 : 0

| | | | | | XB= 1 :

| | | | | | | XK= 0 :

| | | | | | | | XC= 0 : 1

| | | | | | | | XC= 1 :

| | | | | | | | | XS= 0 :

| | | | | | | | | | XL= 0 :

| | | | | | | | | | | XK= 0 : 0

| | | | | | | | | | | XK= 1 : 0

| | | | | | | | | | XL= 1 : 0

| | | | | | | | | XS= 1 : 1

| | | | | | | XK= 1 :

| | | | | | | | XL= 0 : 1

| | | | | | | | XL= 1 :

| | | | | | | | | XL= 0 : 0

| | | | | | | | | XL= 1 : 0

| | | | | XF= 1 :

| | | | | | XH= 0 :

| | | | | | | XG= 0 : 0

| | | | | | | XG= 1 : 0

| | | | | | XH= 1 :

| | | | | | | XJ= 0 : 0

| | | | | | | XJ= 1 : 0

| | | | XJ= 1 :

| | | | | XO= 0 : 0

| | | | | XO= 1 : 0

| | | XD= 1 :

| | | | XF= 0 :

| | | | | XU= 0 :

| | | | | | XL= 0 : 1

| | | | | | XL= 1 :

| | | | | | | XR= 0 :

| | | | | | | | XD= 0 : 0

| | | | | | | | XD= 1 : 0

| | | | | | | XR= 1 : 1

| | | | | XU= 1 :

| | | | | | XB= 0 : 0

| | | | | | XB= 1 :

| | | | | | | XG= 0 : 0

| | | | | | | XG= 1 : 0

| | | | XF= 1 :

| | | | | XC= 0 :

| | | | | | XN= 0 : 1

| | | | | | XN= 1 :

| | | | | | | XI= 0 :

| | | | | | | | XB= 0 :

| | | | | | | | | XL= 0 : 0

| | | | | | | | | XL= 1 : 1

| | | | | | | | XB= 1 : 0

| | | | | | | XI= 1 :

| | | | | | | | XD= 0 : 0

| | | | | | | | XD= 1 : 0

| | | | | XC= 1 :

| | | | | | XC= 0 : 0

| | | | | | XC= 1 : 0

| | XG= 1 :

| | | XS= 0 :

| | | | XB= 0 :

| | | | | XG= 0 : 0

| | | | | XG= 1 : 0

| | | | XB= 1 :

| | | | | XF= 0 : 0

| | | | | XF= 1 :

| | | | | | XM= 0 : 0

| | | | | | XM= 1 :

| | | | | | | XD= 0 :

| | | | | | | | XR= 0 :

| | | | | | | | | XJ= 0 : 0

| | | | | | | | | XJ= 1 :

| | | | | | | | | | XD= 0 : 0

| | | | | | | | | | XD= 1 : 0

| | | | | | | | XR= 1 : 0

| | | | | | | XD= 1 :

| | | | | | | | XK= 0 :

| | | | | | | | | XH= 0 : 1

| | | | | | | | | XH= 1 :

| | | | | | | | | | XB= 0 : 0

| | | | | | | | | | XB= 1 : 0

| | | | | | | | XK= 1 : 0

| | | XS= 1 :

| | | | XQ= 0 :

| | | | | XD= 0 :

| | | | | | XU= 0 :

| | | | | | | XC= 0 :

| | | | | | | | XT= 0 :

| | | | | | | | | XE= 0 : 0

| | | | | | | | | XE= 1 : 0

| | | | | | | | XT= 1 :

| | | | | | | | | XE= 0 : 0

| | | | | | | | | XE= 1 : 0

| | | | | | | XC= 1 :

| | | | | | | | XT= 0 :

| | | | | | | | | XS= 0 : 0

| | | | | | | | | XS= 1 : 0

| | | | | | | | XT= 1 : 1

| | | | | | XU= 1 :

| | | | | | | XU= 0 : 0

| | | | | | | XU= 1 : 0

| | | | | XD= 1 : 0

| | | | XQ= 1 :

| | | | | XB= 0 :

| | | | | | XM= 0 :

| | | | | | | XB= 0 : 0

| | | | | | | XB= 1 : 0

| | | | | | XM= 1 :

| | | | | | | XQ= 0 : 0

| | | | | | | XQ= 1 : 0

| | | | | XB= 1 :

| | | | | | XQ= 0 : 0

| | | | | | XQ= 1 : 0

Total number of nodes in the initial tree using ID3= 265

Average depth of Decision Tree using ID3:9.0

Total number of nodes in the Random tree : 351

Average depth of random Decision Tree:9.0

Accuracy of the model generated by ID3 on the training data = 100.00%

Accuracy of the random model on the training data = 58.07%

Accuracy of the ID3 model on the validation data = 74.31%

Accuracy of the random model on the validation data = 52.37%

Accuracy of the ID3 model on the testing data = 75.16%

Accuracy of the random model on the testing data = 51.42%