EXAMEN DE PROGRAMACIÓN EN R· 19/12/17

EJERCICIO 1:

```
n=4
A=matrix(c(3,8,15,log(3),-1,5/4,sin(8),4/3,2,-0.01,pi,0,6,-4,12,2),nrow=n,ncol=n)
L=matrix(c(0),nrow=n,ncol=n); U=matrix(c(0),nrow=n,ncol=n)
A

for(k in 1:n){
        for(i in k:n){
                s1=0
                p=1
                while(p<=(k-1)){
                        s1=s1+(L[i,p]*U[p,k])
                        p=p+1
                }
                L[i,k]=A[i,k]-s1
        }
}

for(k in 1:n){
        for(i in k:n){
                s2=0
                p=1
                while(p<=(k-1)){
                        s2=s2+(L[k,p]*U[p,i])
                        p=p+1
                }
                U[k,i]=(A[k,i]-s2)/L[k,k]
        }
}
L
U
L%*%U
A
```

EJERCICIO 2:

```
A=matrix(c(-3,4/3,-2,5/4,-40,exp(3),7,-1,-0.01,-0.5,0.2,14),nrow=3,ncol=4)
elmax=A[1,1]; elmin=A[1,1]; imax=1; jmax=1; imin=1; jmin=1

for(i in 1:3){
        for(j in 1:4){
                if(abs(A[i,j])>abs(elmax)){
                        elmax=A[i,j]
                        imax=i
                        jmax=j
                }
                if(abs(A[i,j])<abs(elmin)){
                        elmin=A[i,j]
                        imin=i
                        jmin=j
                }
        }
}
elmax; imax; jmax
elmin; imin; jmin
```

EJERCICIO 1:

```
f=function(x){sin(x)+cos(1+(x^2))-1}
a=0; b=pi; N=100
s=seq(a,b,length=N)
h=(b-a)/(N-1)

suma=0; i=1
while(i<=(N-1)){
        suma=suma+f(((s[i]+s[i+1])/2)-((h*sqrt(3))/3))+f(((s[i]+s[i+1])/2)+((h*sqrt(3))/3))
        i=i+1
}
integral=h/2*suma
integral
integrate(f,a,b)

#Ejercicio 2
C=c(0,5,10,15,25)
T=c(10,35,25,-20,-10)
A=cbind(C,T)

Tmax=A[1,2];Tmin=A[1,2];xmax=1;xmin=1
for(i in 1: length(T)){
        if(A[i,2]>Tmax){
                Tmax=A[i,2]
                xmax=i
        }
        if(A[i,2]<Tmin){
                Tmin=A[i,2]
                xmin=i
        }
}
A
Tmax; xmax
Tmin; xmin
```

EXAMEN DE PROGRAMACIÓN CON R· 30/06/2020

APARTADO A:

```
nt=5
B=c(20,56,89,90,143)
t=seq(0, 1, length=5)
y=c(0.15, 0.35, 0.55)

ECOLI=matrix(c(0), nrow=nt, ncol=nt)
for (i in 1:nt){
        ECOLI[i,1]=B[i]
}
for (j in 2:nt){
        for (i in 1:(nt-j+1)){
                ECOLI[i,j]=(ECOLI[i+1,j-1]-ECOLI[i, j-1])/(t[i+j-1] - t[i])
        }
}
ECOLI
```

APARTADO B:

```
M=length(y)
BEST=0
for (k in 1:M){
        BEST[k]=ECOLI[1,1]
        for (i in 2:nt){
                p=1
                for (j in 1:(i-1)){
                        p=p*(y[k] - t[j])
                }
                BEST[k]=BEST[k]+ECOLI[1,i]*p
        }
}
BEST
```

APARTADO C:

```
plot(x=t,y=B,pch=2,type='b',col='blue',xlim=c(t[1], t[nt]),ylim=c(B[1], B[nt]),xlab="Tiempo", ylab="ECOLI")
par(new=TRUE)
plot(x=y,y=BEST,pch=3,type='b',col='red',xlim=c(t[1], t[nt]),ylim=c(B[1], B[nt]),xlab="",ylab="")
```