MA691-Assignment 1
Statistical Simulation & Data Analysis

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Contents

1 Question 1

1.1 Part A

```
y1=array();
y2=array();

x1=array();
x2=array();
x3=array();
beta1=1;
beta2=2;
beta3=3;

theta=4;
for(i in 1:50)
{
        x1[i]=runif(1);
        x2[i]=runif(1);
        x3[i]=runif(1);

        x1[i]=((-log(1-x1[i]))^(1/beta1))/theta;
        x2[i]=((-log(1-x2[i]))^(1/beta2))/theta;
        x3[i]=((-log(1-x3[i]))^(1/beta3))/theta;


        if(x1[i]<x3[i])
        {
                y1[i]=x1[i];
        }else{
                y1[i]=x3[i];
        }

        if(x2[i]<x3[i])
        {
                y2[i]=x2[i];
        }else{
                y2[i]=x3[i];
        }
}
```

1.2 Part B

```
y1=array();
y2=array();

x1=array();
x2=array();
x3=array();
beta1=1;
beta2=2;
beta3=3;

theta=4;
for(i in 1:50)
{
        x1[i]=runif(1);
        x2[i]=runif(1);
        x3[i]=runif(1);

        x1[i]=((-log(1-x1[i]))^(1/beta1))/theta;
        x2[i]=((-log(1-x2[i]))^(1/beta2))/theta;
        x3[i]=((-log(1-x3[i]))^(1/beta3))/theta;


        if(x1[i]<x3[i])
        {
                y1[i]=x1[i];
        }else{
                y1[i]=x3[i];
        }

        if(x2[i]<x3[i])
        {
                y2[i]=x2[i];
        }else{
                y2[i]=x3[i];
        }
}

Y1=array();
Y2=array();
l=1;
for(i in 1:50)
{
```

```
        if(y1[i]!=y2[i])
        {

                Y1[l]=y1[i];
                Y2[l]=y2[i];
                l=l+1;
        }
}
```

2 Question 2

2.1 Part A

```
y1=array();
y2=array();

x1=array();
x2=array();
x3=array();
lambda1=1;
lambda2=2;
lambda3=3;

alpha=4;
for(i in 1:50)
{
        x1[i]=runif(1);
        x2[i]=runif(1);
        x3[i]=runif(1);

        x1[i]=(-(log(1-x1[i])))/lambda1)^(1/alpha);
        x2[i]=(-(log(1-x2[i])))/lambda2)^(1/alpha);
        x3[i]=(-(log(1-x3[i])))/lambda3)^(1/alpha);


        if(x1[i]<x3[i])
        {
                y1[i]=x1[i];
        }else{
                y1[i]=x3[i];
        }

        if(x2[i]<x3[i])
```

```
        {
                y2[i]=x2[i];
        }else{
                y2[i]=x3[i];
        }
}
```

2.2 Part B

```
Y1=array();
Y2=array();
lambda1=1;
lambda2=2;
lambda3=3;

alpha=4;
i=1;
while(i<=50)
{
        x1=runif(1);
        x2=runif(1);
        x3=runif(1);

        x1=(-(log(1-x1))/lambda1)^(1/alpha);
        x2=(-(log(1-x2))/lambda2)^(1/alpha);
        x3=(-(log(1-x3))/lambda3)^(1/alpha);


        if(x1<x3)
        {
                y1=x1;
        }else{
                y1=x3;
        }

        if(x2<x3)
        {
                y2=x2;
        }else{
                y2=x3;
        }

        if(y1!=y2)
```

```
        {
                Y1[i]=y1;
                Y2[i]=y2;
                i=i+1;
        }


}
```

3 Question 3