CS504- Programming Languages for Data Analysis

Assignment 1

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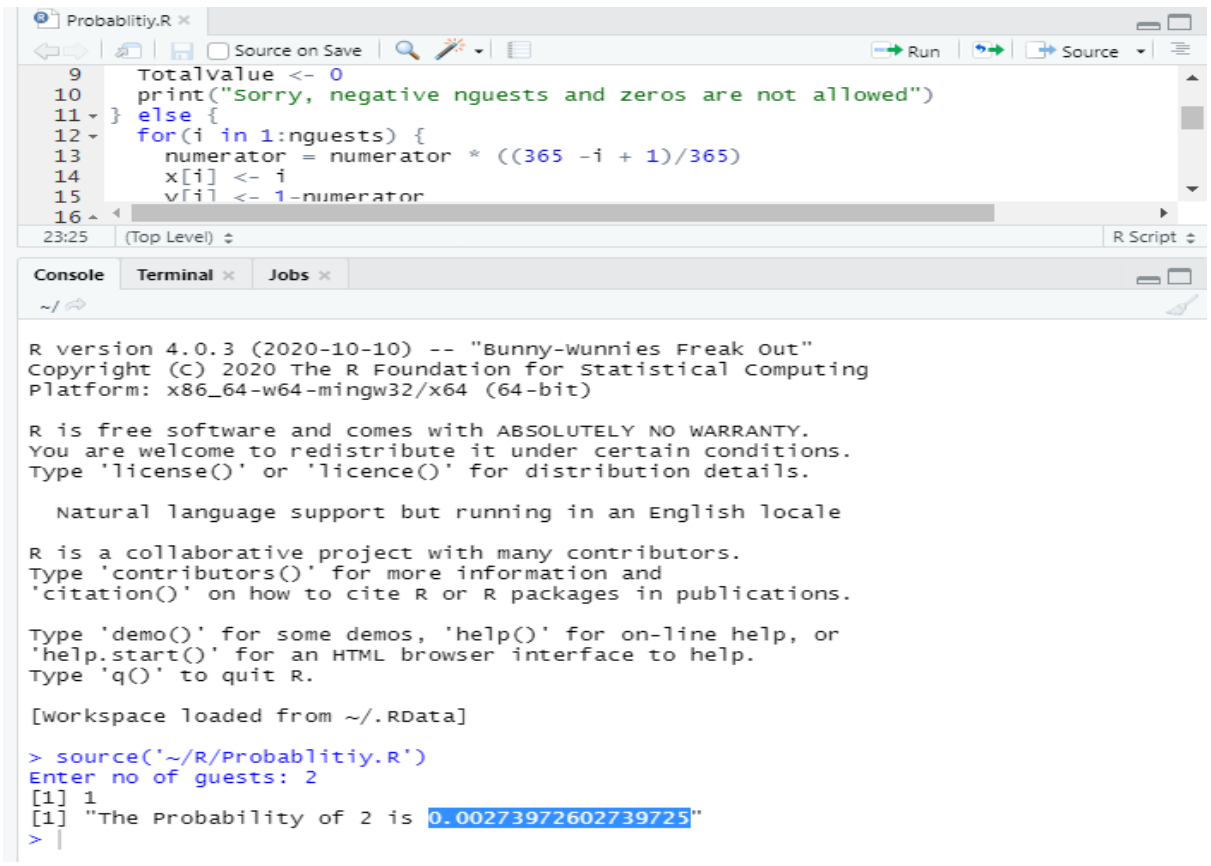
The probability result of finding a pair of people that share the same birthday for n guests (n is taken as input)
The outputs is shown below which are executed in different languages

Output results by R programming language:

Question1:

For input n=2



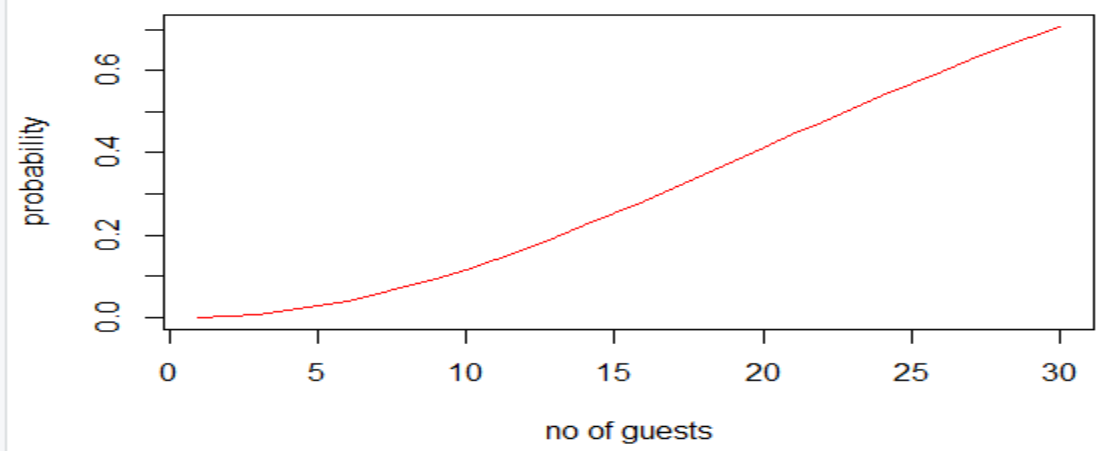
For input n=30

```
  y <- rep(1, length(nguests))
  print(x)
# check is the input is negative, positive or zero
if(nguests <= 0) {
  Totalvalue <- 0
  print("Sorry, negative nguests and zeros are not allowed")
} else {
  for(i in 1:nguests) {
    numerator = numerator * ((365 -i + 1)/365)
    x[i] <- i
    y[i] <- 1-numerator
  }
  Totalvalue <- 1-(numerator)
  plot(x, y, type = "l", pch = 19,col = "red", xlab = "no of guests", ylab =

}
  return(Totalvalue)
}
```

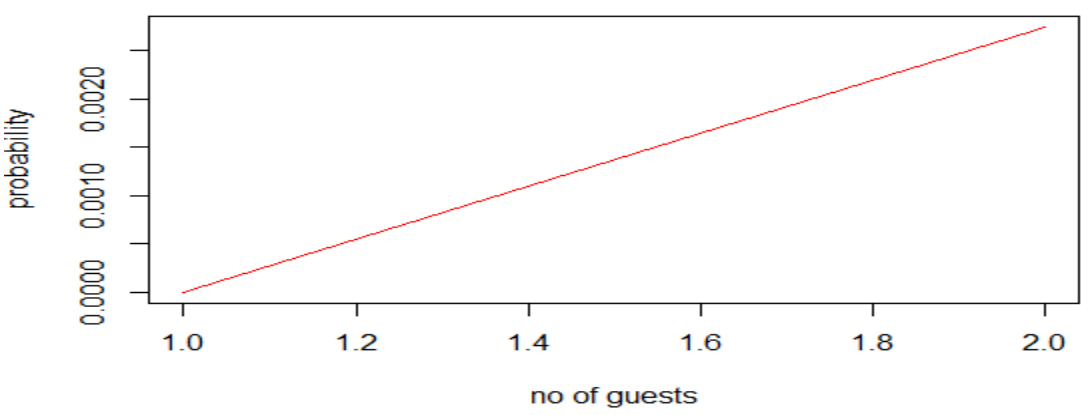
```
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

> source('~/R/Probablitiy.R')
Enter no of guests: 2
[1] 1
[1] "The Probability of 2 is 0.00273972602739725"
> source('~/R/Probablitiy.R')
Enter no of guests: 30
[1] 1
[1] "The Probability of 30 is 0.706316242719269"
>
```

Question 2:

n=30 Graph:



n=2 Graph:



Output results by python programming language :

Question1:

For input n=2

In [7]:
```
try:
    n = int(input("Enter the number of guests: "))
    if n<=0:
        print('Please enter the positive integer which is greater than >=1')
except:
    print('Error : The number you entered is not an integer')

numerator = 1
x = [i for i in range(1,n+1)]
y = []
for i in range(1,n+1):
    numerator = numerator*((365-i+1)/365)
    print('If the no of guests={} then the probability is {}'.format(i,1-numerator))
    y.append(1-numerator)
```

```
Enter the number of guests: 2
If the no of guests=1 then the probability is 0.0
If the no of guests=2 then the probability is 0.002739726027397249
```

For input n=30

In [4]:
```
try:
    n = int(input("Enter the number of guests: "))
    if n<=0:
        print('Please enter the positive integer which is greater than >=1')
except:
    print('Error : The number you entered is not an integer')

numerator = 1
x = [i for i in range(1,n+1)]
y = []
for i in range(1,n+1):
    numerator = numerator*((365-i+1)/365)
    print('If the no of guests={} then the probability is {}'.format(i,1-numerator))
    y.append(1-numerator)
```

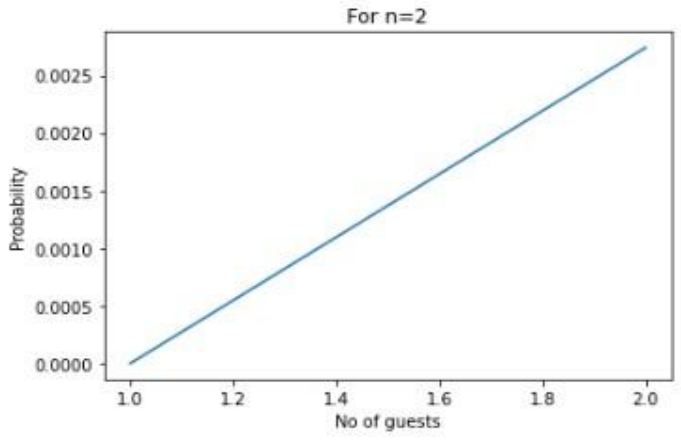
```
Enter the number of guests: 30
If the no of guests=1 then the probability is 0.0
If the no of guests=2 then the probability is 0.002739726027397249
If the no of guests=3 then the probability is 0.008204165884781345
If the no of guests=4 then the probability is 0.016355912466550215
If the no of guests=5 then the probability is 0.02713557369979347
If the no of guests=6 then the probability is 0.040462483649111425
If the no of guests=7 then the probability is 0.056235703095975365
If the no of guests=8 then the probability is 0.07433529235166902
If the no of guests=9 then the probability is 0.09462383388916673
If the no of guests=10 then the probability is 0.11694817771107768
If the no of guests=11 then the probability is 0.14114137832173312
If the no of guests=12 then the probability is 0.1670247888380645
If the no of guests=13 then the probability is 0.19441027523242949
If the no of guests=14 then the probability is 0.2231025120049731
If the no of guests=15 then the probability is 0.25290131976368646
If the no of guests=16 then the probability is 0.2836040052528501
If the no of guests=17 then the probability is 0.3150076652965609
If the no of guests=18 then the probability is 0.3469114178717896
If the no of guests=19 then the probability is 0.37911852603153695
If the no of guests=20 then the probability is 0.41143838358058027
If the no of guests=21 then the probability is 0.443688335165206
If the no of guests=22 then the probability is 0.4756953076625503
If the no of guests=23 then the probability is 0.5072972343239857
If the no of guests=24 then the probability is 0.538344257914529
If the no of guests=25 then the probability is 0.568699703969464
If the no of guests=26 then the probability is 0.598240820135939
If the no of guests=27 then the probability is 0.6268592822632421
If the no of guests=28 then the probability is 0.6544614723423995
If the no of guests=29 then the probability is 0.6809685374777771
If the no of guests=30 then the probability is 0.7063162427192688
```

Question 2:

n=2 Graph:

```
In [8]: import matplotlib.pyplot as plt
        plt.plot(x,y)
        plt.xlabel('No of guests')
        plt.ylabel('Probability')
        plt.title('For n={}'.format(n))
```

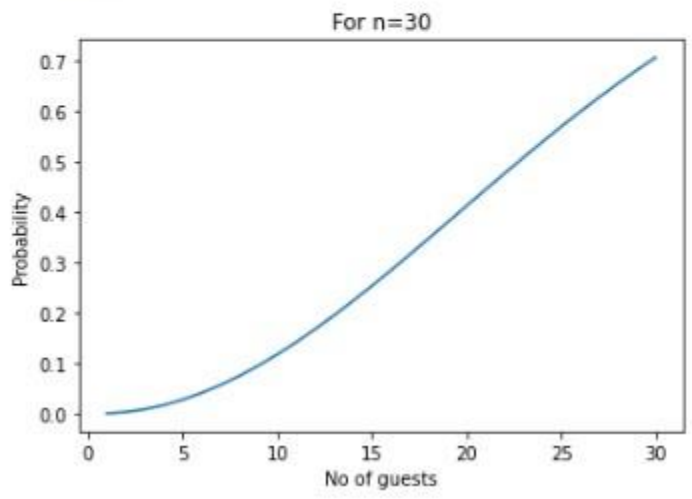
```
Out[8]: Text(0.5, 1.0, 'For n=2')
```



n=30 Graph:

```
In [5]: import matplotlib.pyplot as plt
        plt.plot(x,y)
        plt.xlabel('No of guests')
        plt.ylabel('Probability')
        plt.title('For n={}'.format(n))
```

```
Out[5]: Text(0.5, 1.0, 'For n=30')
```



Output results by Julia programming language:

Question1:

For input n=2

```
In [3]: println("Enter the number of guests: ")
        num = readline()
        num = parse(Int64, num)
        if (num<=0)
            println("Please enter the positive integer which is greater than >=1")
        end
        numerator = 1
        x = []
        for i = 1:num
            append!( x,i)
        end
        y = []
        for i= 1:num
            numerator = numerator*((365-i+1)/365)
            println("If the no of guests=$i then the probability is $(1-numerator)")
            append!(y,1-numerator)
        end
```

```
Enter the number of guests:
stdin> 2
If the no of guests=1 then the probability is 0.0
If the no of guests=2 then the probability is 0.002739726027397249
```

For input n=30

In [1]:
```
println("Enter the number of guests: ")
num = readline()
num = parse(Int64, num)
if (num<=0)
    println("Please enter the positive integer which is greater than >=1")
end
numerator = 1
x = []
for i = 1:num
    append!( x,i)
end
y = []
for i= 1:num
    numerator = numerator*((365-i+1)/365)
    println("If the no of guests=$i then the probability is $(1-numerator)")
    append!(y,1-numerator)
end
```

```
Enter the number of guests:
stdin> 30
If the no of guests=1 then the probability is 0.0
If the no of guests=2 then the probability is 0.002739726027397249
If the no of guests=3 then the probability is 0.008204165884781345
If the no of guests=4 then the probability is 0.016355912466550215
If the no of guests=5 then the probability is 0.02713557369979347
If the no of guests=6 then the probability is 0.040462483649111425
If the no of guests=7 then the probability is 0.056235703095975365
If the no of guests=8 then the probability is 0.07433529235166902
If the no of guests=9 then the probability is 0.09462383388916673
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If the no of guests=11 then the probability is 0.14114137832173312
If the no of guests=12 then the probability is 0.1670247888380645
If the no of guests=13 then the probability is 0.19441027523242949
If the no of guests=14 then the probability is 0.2231025120049731
If the no of guests=15 then the probability is 0.25290131976368646
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If the no of guests=24 then the probability is 0.538344257914529
If the no of guests=25 then the probability is 0.568699703969464
If the no of guests=26 then the probability is 0.598240820135939
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If the no of guests=29 then the probability is 0.6809685374777771
If the no of guests=30 then the probability is 0.7063162427192688
```
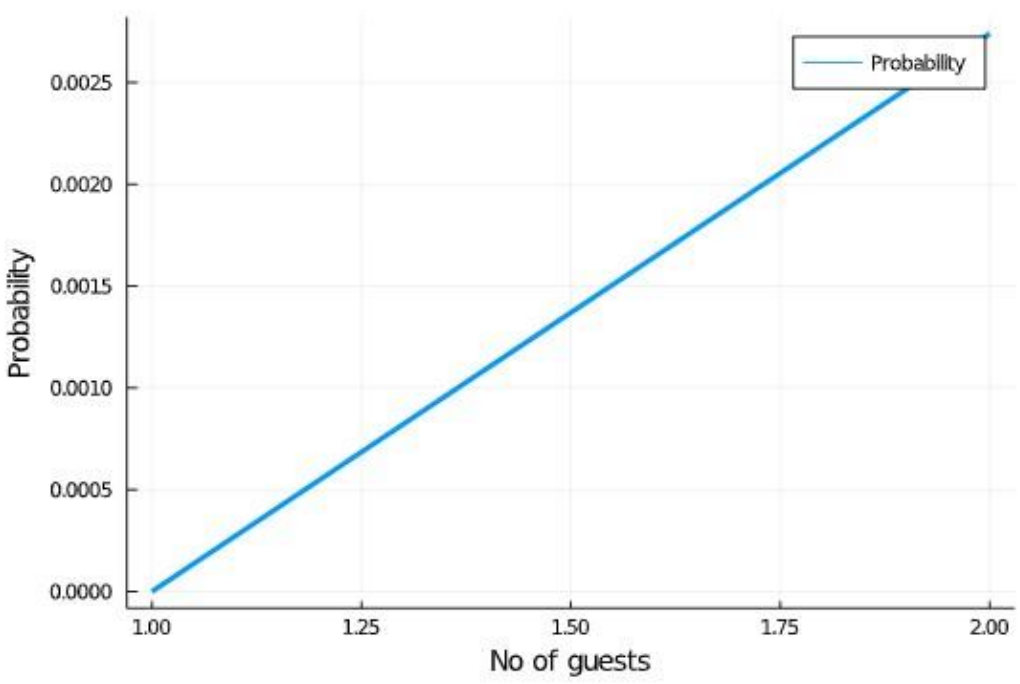

Question 2:

n=2 Graph:

In [4]:
```
using Plots
plot(x, y,label = "Probability", lw = 3)
xlabel!("No of guests")
ylabel!("Probability")
```

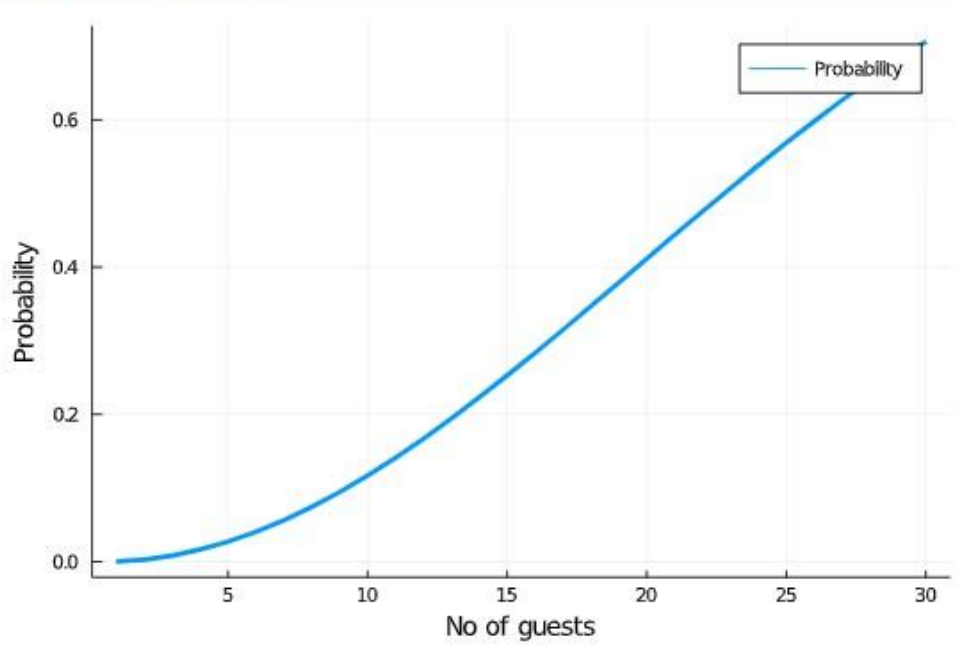
Out[4]:



n=30 Graph:

```
In [2]: using Plots
        plot(x, y,label = "Probability", lw = 3)
        xlabel!("No of guests")
        ylabel!("Probability")
```

Out[2]:



Output results by octave programming language:

Question1 :

For input n=2

```
1  # Implementing the equation of probability
2  n= input("choose the number of guests:" );
3  numerator=1;
4  if(n<=0)
5    disp("sorry negative or zero numbers are not allowed");
6  else
7    for i = [1:n]
8      numerator=numerator*((365-i+1)/365);
9      x(i)=i;
10     y(i)=1-numerator;
11     fprintf(["The probability of having " ,num2str(i), "  guest is:",num2str(1-numerator),'\n']);
12   endfor
13   plot(x,y,"or-")
14   title("Equation of probability")
15   xlabel('nguests')
16   ylabel('probability')
17 endif
```

```
Command Window
>> octave_code
choose the number of guests:2
The probability of having 1  guest is:0
The probability of having 2  guest is:0.0027397
>>
```

For input n=30

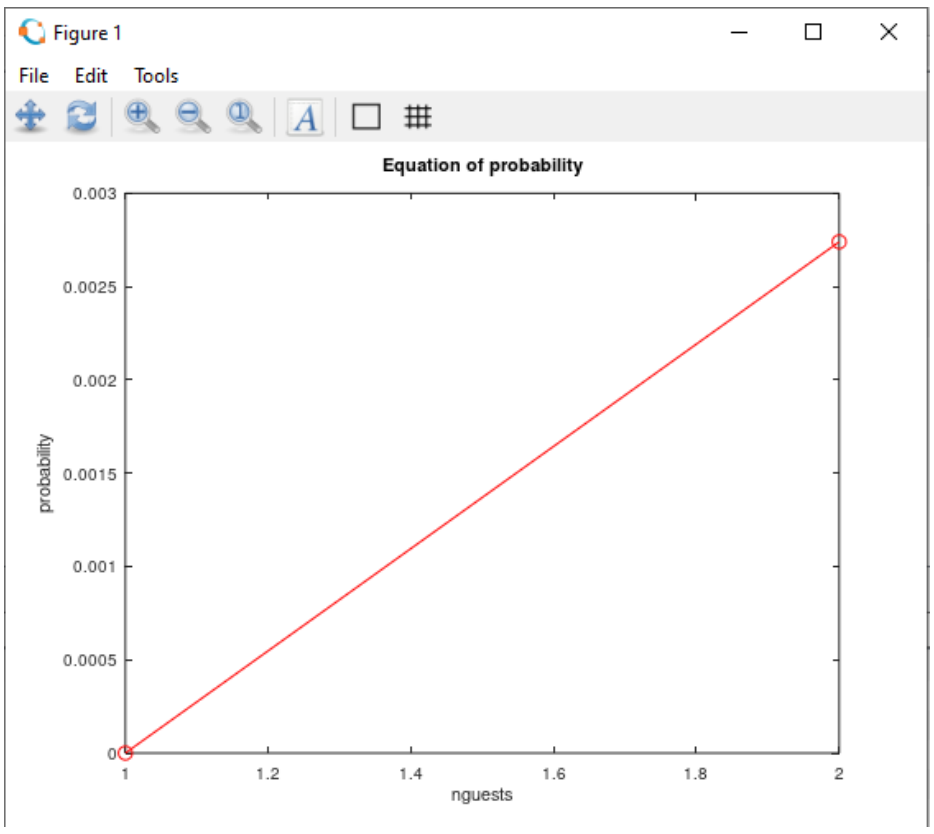
```
# Implementing the equation of probability
n= input("choose the number of guests:" );
numerator=1;
if(n<=0)
  disp("sorry negative or zero numbers are not allowed");
else
  for i = [1:n]
    numerator=numerator*((365-i+1)/365);
    x(i)=i;
    y(i)=1-numerator;
    fprintf(["The probability of having " ,num2str(i), "  guest is:",num2str(1-numerator),'\n']);
  endfor
  plot(x,y,"or-")
  title("Equation of probability")
  xlabel('nguests')
  ylabel('probability')
endif
```

Command Window

```
>> octave_code
choose the number of guests:30
The probability of having 1  guest is:0
The probability of having 2  guest is:0.0027397
The probability of having 3  guest is:0.0082042
The probability of having 4  guest is:0.016356
The probability of having 5  guest is:0.027136
The probability of having 6  guest is:0.040462
The probability of having 7  guest is:0.056236
The probability of having 8  guest is:0.074335
The probability of having 9  guest is:0.094624
The probability of having 10  guest is:0.11695
The probability of having 11  guest is:0.14114
The probability of having 12  guest is:0.16702
The probability of having 13  guest is:0.19441
The probability of having 14  guest is:0.2231
The probability of having 15  guest is:0.2529
The probability of having 16  guest is:0.2836
The probability of having 17  guest is:0.31501
The probability of having 18  guest is:0.34691
The probability of having 19  guest is:0.37912
The probability of having 20  guest is:0.41144
The probability of having 21  guest is:0.44369
The probability of having 22  guest is:0.4757
The probability of having 23  guest is:0.5073
The probability of having 24  guest is:0.53834
The probability of having 25  guest is:0.5687
The probability of having 26  guest is:0.59824
The probability of having 27  guest is:0.62686
The probability of having 28  guest is:0.65446
The probability of having 29  guest is:0.68097
The probability of having 30  guest is:0.70632
>>
```

Question 2:

n=2 Graph:



n=30 Graph:

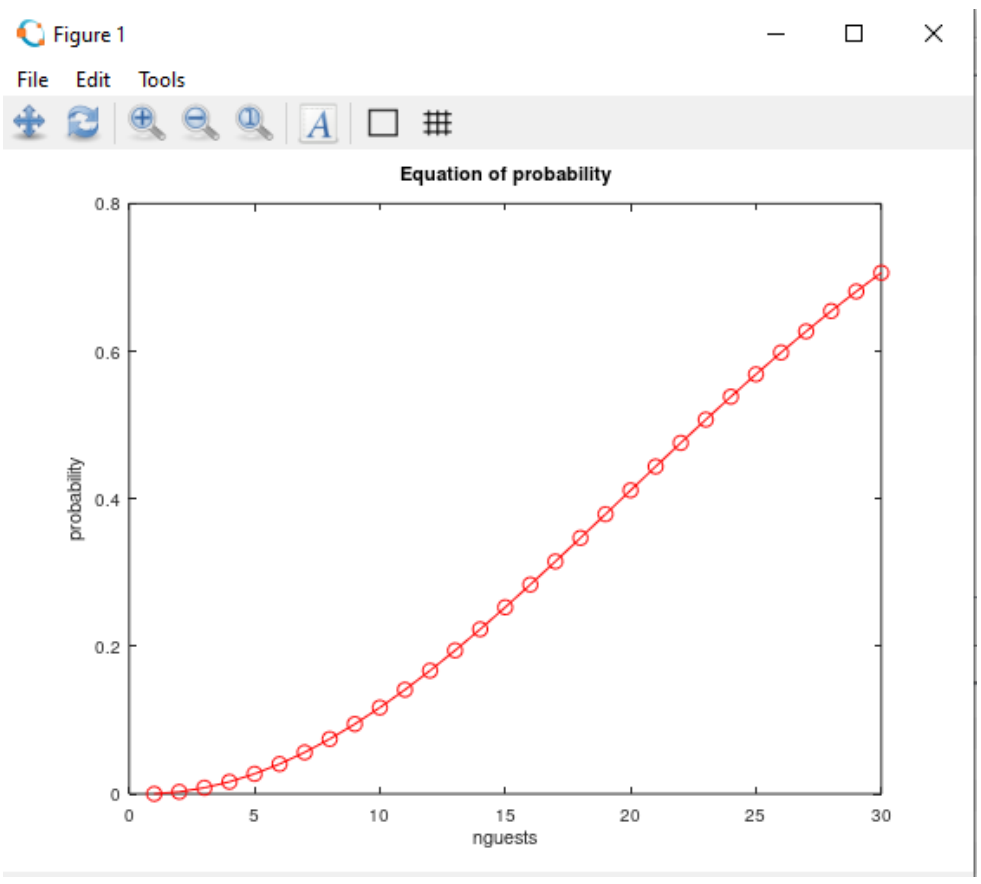


Figure 1
File Edit Tools
Equation of probability
probability
nguests
0
0.2
0.4
0.6
0.8
0
5
10
15
20
25
30