

Домашна работа по R

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Задача 1

```
shots = c(
  8, 5, 12, 11, 12, 8, 6, 7, 11, 7, 11, 13, 15,
  12, 17, 12, 9, 15, 8, 11, 11, 13, 10, 8, 12, 12, 11,
  13, 12, 14, 9, 11, 13, 10, 10, 12, 13, 10, 15, 12, 15, 12
)
```

1.1

```
f1 = function(p,element){
  x= dbinom(x=element,30,p)
  result = log(x)
  result
}
```

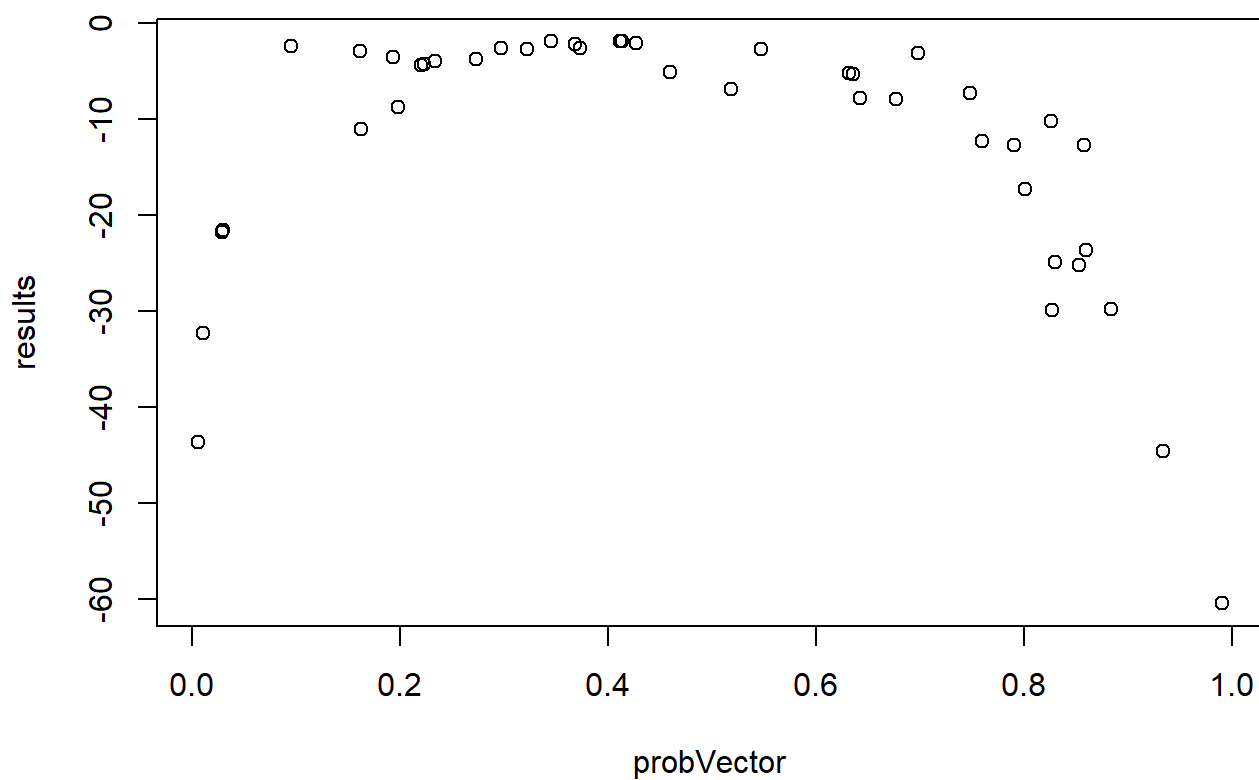
1.2

```
#Използвам runif за редица между 0 и 1
probVector = runif(n=length(shots))
results = c()
for (i in 1:length(shots)) {
  prob = f1(probVector[i],shots[i])
  results = append(results,prob)
  print(results[i])
}
```

```
## [1] -44.595
## [1] -2.383411
## [1] -5.230168
## [1] -1.929492
## [1] -1.92327
## [1] -2.880493
## [1] -29.91605
## [1] -6.884359
## [1] -7.964141
## [1] -5.07813
## [1] -21.79922
## [1] -2.188831
## [1] -12.67946
## [1] -12.70999
## [1] -3.087432
## [1] -3.966516
## [1] -25.22217
## [1] -10.25043
## [1] -24.93234
## [1] -21.53075
## [1] -12.27065
## [1] -2.710416
## [1] -23.60448
## [1] -2.581929
## [1] -1.925875
## [1] -2.637965
## [1] -32.31895
## [1] -60.42099
## [1] -5.334328
## [1] -7.315359
## [1] -29.80676
## [1] -2.126297
## [1] -2.740269
## [1] -17.27828
## [1] -7.779711
## [1] -4.346211
## [1] -3.703889
## [1] -3.501312
## [1] -11.05981
## [1] -43.65269
## [1] -8.725778
## [1] -4.272256
```

1.3

#Използвам plot с type="p", защото пресъздава scatter plot
`plot(x = probVector, y = results, type="p")`



1.4

```
theBestProb = function(probVector, probs){  
  resultP = probVector[which.max(probs)]  
  resultP  
}  
theBestProb(probVector,results)
```

```
## [1] 0.4116958
```

Задача 2

2.1

```
cars = mtcars[1:5, ]
```

2.2

```
maxHpCarF = function(){  
  maxHpCar = mtcars$hp[which.max(mtcars$hp)]  
  MaxHpCarName = rownames(mtcars)[which.max(mtcars$hp)]  
  result = paste(MaxHpCarName, " : ")  
  result = paste(result, maxHpCar)  
  result = paste(result, "hp")  
  result  
}  
maxHpCarF()
```

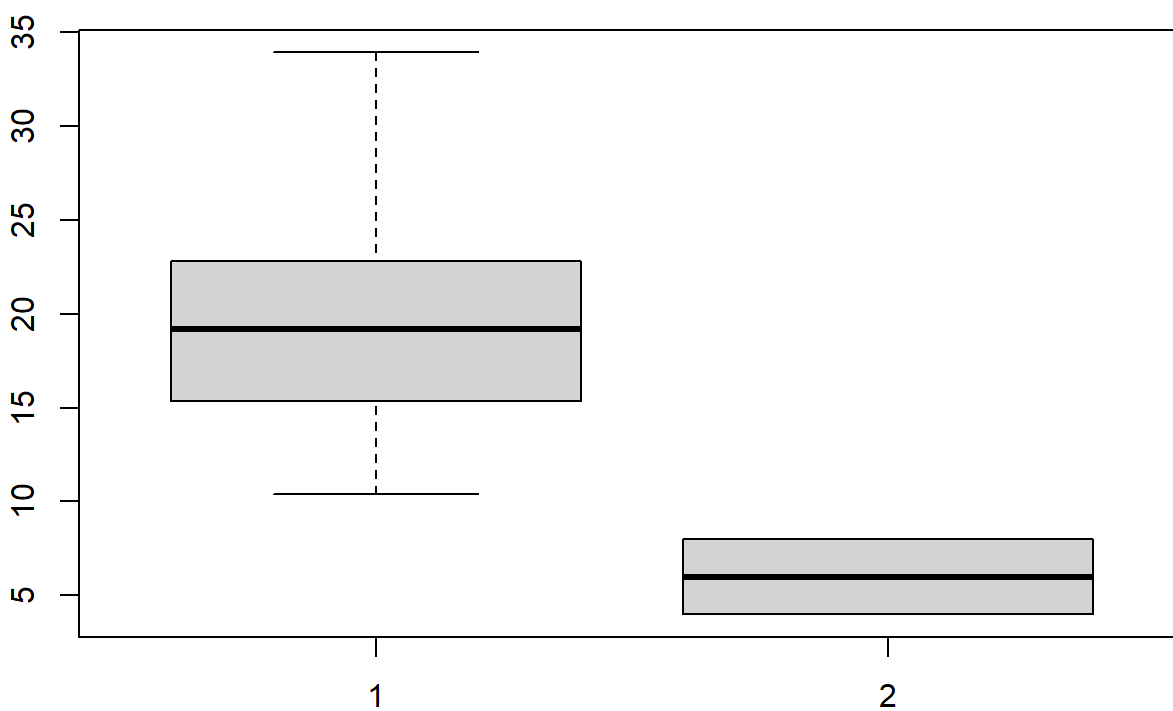
```
## [1] "Maserati Bora   : 335 hp"
```

```
#Top 5 lighter cars  
topFiveLighter = function(){  
  o = order(mtcars$wt, decreasing = F)  
  lightCars = mtcars$wt[o][1:5]  
  lightCarsName = rownames(mtcars[o, ])[1:5]  
  for (i in 1:5) {  
    r = paste(lightCarsName[i], " --> ")  
    r = paste(r, lightCars[i])  
    print(r)  
  }  
}  
topFiveLighter()
```

```
## [1] "Lotus Europa  -->  1.513"  
## [1] "Honda Civic  -->  1.615"  
## [1] "Toyota Corolla  -->  1.835"  
## [1] "Fiat X1-9  -->  1.935"  
## [1] "Porsche 914-2  -->  2.14"
```

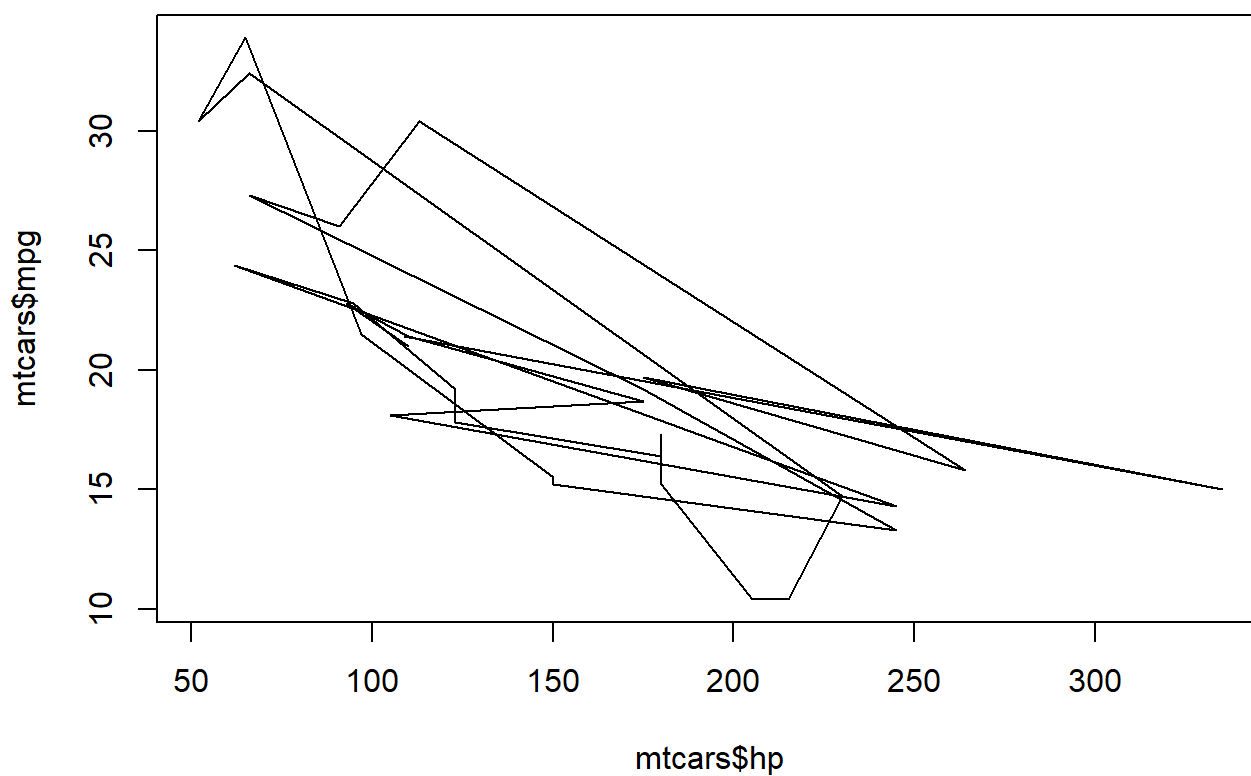
2.3

```
boxplot(mtcars$mpg,mtcars$cyl)
```



2.4

```
plot(mtcars$hp, mtcars$mpg,type = "l")
```



```
#Корелация:  
cor(mtcars$hp,mtcars$mpg)
```

```
## [1] -0.7761684
```

2.5

```
getTop20PercentHp = function(topPercent){  
  result = quantile(mtcars$hp,1-(topPercent/100))  
  result = paste(result,"hp")  
  result  
}  
getTop20PercentHp(20)
```

```
## [1] "200 hp"
```

2.6

```
getPercentOfLowerThanSomeHp = function(s){  
  lowerThanS = length(mtcars$hp[mtcars$hp<=s])  
  allCars = length(mtcars$hp)  
  result = lowerThanS/allCars *100  
  result = paste(result,"%")  
  result  
}  
getPercentOfLowerThanSomeHp(100)
```

```
## [1] "28.125 %"
```

2.7

```
#P(mtcars$cyl = 8 | mtcars$gear = 5) = ?  
prop.table(table(mtcars$cyl,mtcars$gear),2)[3,3]
```

```
## [1] 0.4
```

Задача 3

Функцията има следния алгоритъм:

Нека минималния брой дъвки със всички герои е 20. Нека всеки герой е число от 1 до 20. Тогава правим тестове, докато в `count` не получим списък от 20 елемента, които да са различни един от друг(функцията `unique` филтрира повторенията). Ако след даден тест с бройката дъвки не получим 20 различни герои, повишаваме бройката дъвки, докато не получим верен резултат и извеждаме колко дъвки са ни необходими

```
countBubbleGums = function(){  
  minSizeOfGums = 20  
  isOk = FALSE  
  while(!isOk){  
    count = sample(1:20,size = minSizeOfGums,replace = T)  
    filteredGums = unique(count)  
    if(length(filteredGums)==20){  
      isOk = TRUE  
    }  
    else{  
      minSizeOfGums = minSizeOfGums + 1  
    }  
  }  
  minSizeOfGums  
}  
print(countBubbleGums())
```

```
## [1] 34
```