Note: These are very difficult problems to solve. If you are not able to solve them, dont worry. You will learn a lot in attempt to solve , even if you are not able to completely solve them eventually. Thats the idea.

1 Use various utility functions discussed to create vectors containing these values. You need to create both [first containing 10 values and another containing 26] vectors separately.

```
## [1]    2    4    8   16   32   64  128  256  512 1024
```

```
##  [1] "a26" "b25" "c24" "d23" "e22" "f21" "g20" "h19" "i18" "j17" "k16"
## [12] "l15" "m14" "n13" "o12" "p11" "q10" "r9"  "s8"  "t7"  "u6"  "v5"
## [23] "w4"  "x3"  "y2"  "z1"
```

2 Below given is a vector containing first lines of many addresses. Extract city names from all the addresses using string functions. Hint: you can use a for loop to iterate over results of strsplit for further processing.

```r
address_list=c("802/hiranandani/Mumbai",
               "2A/kalka-Delhi",
               "345#near adyar#Chennai",
               "10-shyaam bazzar-Kolkata")
```

Result will be as follows:

```
## [1] "Mumbai"
## [1] "Delhi"
## [1] "Chennai"
## [1] "Kolkata"
```

3 Use following bit to create a vector with prime numbers in 1:47. [Prime numbers are numbers which are divisible only by themselves.]

```r
primes=c(2,3,5,7,11,13,17,19,23,29,31,37,41,43,47)
```

Any number from 48 to 100 which is not divisible by any of the above listed primes is also a prime. Print those prime numbers from 48 to 100.

Result will be as follows:

```
## [1] 53
## [1] 59
## [1] 61
## [1] 67
## [1] 71
## [1] 73
## [1] 79
## [1] 83
## [1] 89
## [1] 97
```

4 Find out , how many cars are there are in the dataset mtcars which have automatic transmission, number of forward gears higher than 3 and below average mileage.List their names. [calculate average mileage from the data itself]. To find out which variable in the data represent mentioned above information do `?mtcars`

5 There is no native function in R to calculate mode for a variable. The function "mode" returns storage mode of an object, not the statistical mode that we discussed in the class.

write a function which returns modes of a character vector. Test that on the following vectors

```
set.seed(2)
x=sample(letters[1:5],50,replace=T)
y=sample(letters[1:3],50,replace=T)
```

Result will be as following:

```
## [1] "e"
```

```
## [1] "a"
```

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Solution will be shared by your instructor over email in some time after the concerned module is finished. Feel free to discuss these question on the QA forum.