;;ITA0448 - R PROGRAMMING
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1. The built-in vector LETTERS contains the uppercase letters of the alphabet. Produce a vector of
(i) the first 12 letters
Code:
Input:
```
print(t)
print("Last 10 letters in upper case:")
t = tail(LETTERS, 12)
print(t)
print("Letters between 1 to 10th letters in upper case:")
e = tail(LETTERS[1:12])
print(e)
```
Output:
```
[1] "Last 10 letters in upper case:"
 [1] "O" "P" "Q" "R" "S" "T" "U" "V" "W" "X" "Y" "Z"
[1] "Letters between 1 to 10th letters in upper case:"
[1] "G" "H" "I" "J" "K" "L"
```
(ii) the odd 'numbered' letters
Code:
Input:
```
num = 13
if((num %% 2) == 0) {
print(paste(num,"is Even"))
} else {
print(paste(num,"is Odd"))
}
```
output:
```
[1] "13 is Odd"
```
(iii) the (English) consonants.
Code:
Input:
```
print(t)
print("Last 10 letters in upper case:")
t = tail(LETTERS, 10)
print(t)
print("Letters between 1 to 13 letters in upper case:")
e = tail(LETTERS[1:13])
print(e)
```
Output:
```
[1] "Last 10 letters in upper case:"
 [1] "Q" "R" "S" "T" "U" "V" "W" "X" "Y" "Z"
[1] "Letters between 1 to 13 letters in upper case:"
[1] "H" "I" "J" "K" "L" "M"
```
2. The function rnorm() generates normal random variables. For instance, rnorm(10) gives a vector

of 10 i.i.d. standard normals. Generate 20 standard normals, and store them as x. Then obtain
subvectors of
(i) the entries in x which are less than 1
Code:
Input:
rnorm(20,0,1)
Output:
[1] -0.088045240 -0.729242032 -0.480808910 -1.990438088 -1.559455563
[6] 0.062536966 -0.764611097 2.601540548 -1.248520256 0.363471561
[11]-1.087711911 0.825376487 0.157459726 1.539458699 0.004567165
[16] -0.044958735 1.096499042 1.724888331 0.200374544 -0.526152404
(ii) the entries between – 0.5 and 1
Code:
Input:
rnorm(0.5,0,1)
Output;
numeric(0)
(iii) the entries whose absolute value is larger than 1.5.
Input:
rnorm(20,0,1)
Output:
[1] -1.42946132 0.34281115 0.85348952 -1.74989089 0.53188410 -1.06360058
[7] 1.02541209 1.51156994 0.90520709 0.07022828 1.35627769
-0.74233582[13] -1.72973071 -0.44984341 -1.46333267 -1.23071187 -0.02137629
0.56008918
[19] -0.91258497 -1.23570662
3. Solve the following system of simultaneous equations using matrix methods.
a + 2b + 3c + 4d + 5e = −5
2a + 3b + 4c + 5d + e = 2
3a + 4b + 5c + d + 2e = 5
4a + 5b + c + 2d + 3e = 10
5a + b + 2c + 3d + 4e = 11
4. Create a factor object for an apple color such as ;green;, ;green;;yellow;, ;red;red, ;red
green;. Print the factor and applying the nlevels function to know the number of distinct
values
Code:
Input:
color <- factor(c("green", "green", "yellow", "red", "red", "red", "green"));
color
nlevels(color)
Output:
[1] green green yellow red red red green
Levels: green red yellow
[1] 3
5. Create an S3 object of class fruit contains a list with following required components such

as name, quantity, cost and also Define and create s4 objects.Define a reference class of
fruit
Code:
Input:
```
fruit<- list(name = "apple", cost = 20, quantity = "15")
class(fruit) <- "fruit_Info"
fruit
```
Output:
```
$name
[1] "apple"

$cost
[1] 20

$quantity
[1] "15"

attr(,"class")
[1] "fruit_Info"
```