AnthonyTimeSeriesAssignment

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library(dplyr)

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

library(ggplot2)

# Load the CSV file  
final\_anormal\_data\_set <- read.csv("/home/anthony/Datasets/final-anormal-data-set.csv")  
head(final\_anormal\_data\_set)

## cpu\_guest cpu\_guest\_nice cpu\_idle cpu\_steal cpu\_iowait cpu\_irq cpu\_nice  
## 1 0 0 0 0 0 0 0  
## 2 0 0 0 0 0 0 0  
## 3 0 0 0 0 0 0 0  
## 4 0 0 0 0 0 0 0  
## 5 0 0 0 0 0 0 0  
## 6 0 0 0 0 0 0 0  
## cpu\_softirq cpu\_system cpu\_total cpu\_user diskio\_sda1\_disk\_name  
## 1 0 2 100 6 sda1  
## 2 0 2 100 39 sda1  
## 3 0 2 100 42 sda1  
## 4 0 2 100 40 sda1  
## 5 0 1 100 37 sda1  
## 6 0 1 100 39 sda1  
## diskio\_sda1\_key diskio\_sda1\_read\_bytes diskio\_sda1\_time\_since\_update  
## 1 disk\_name 0 1  
## 2 disk\_name 0 1.0228629112243652  
## 3 disk\_name 0 1.0591349601745603  
## 4 disk\_name 0 0.9929890632629396  
## 5 disk\_name 0 1.007004976272583  
## 6 disk\_name 0 1.0376579761505127  
## diskio\_sda1\_write\_bytes diskio\_sda\_disk\_name diskio\_sda\_key  
## 1 0 sda disk\_name  
## 2 0 sda disk\_name  
## 3 0 sda disk\_name  
## 4 0 sda disk\_name  
## 5 0 sda disk\_name  
## 6 0 sda disk\_name  
## diskio\_sda\_read\_bytes diskio\_sda\_time\_since\_update diskio\_sda\_write\_bytes  
## 1 0 1 0  
## 2 0 1.0228629112243652 0  
## 3 421888 1.0591349601745603 0  
## 4 159744 0.9929890632629396 58880  
## 5 0 1.007004976272583 0  
## 6 0 1.0376579761505127 425984  
## fs\_.\_device\_name fs\_.\_free fs\_.\_fs\_type fs\_.\_key fs\_.\_mnt\_point  
## 1 /dev/mapper/centos-root 201965568 xfs mnt\_point /  
## 2 /dev/mapper/centos-root 201916416 xfs mnt\_point /  
## 3 /dev/mapper/centos-root 201887744 xfs mnt\_point /  
## 4 /dev/mapper/centos-root 201695232 xfs mnt\_point /  
## 5 /dev/mapper/centos-root 201654272 xfs mnt\_point /  
## 6 /dev/mapper/centos-root 201695232 xfs mnt\_point /  
## fs\_.\_percent fs\_.\_size fs\_.\_used load\_cpucore load\_min1 load\_min15  
## 1 95.7 4708106240 4506140672 1 1.52 0.69  
## 2 95.7 4708106240 4506189824 1 1.52 0.69  
## 3 95.7 4708106240 4506218496 1 1.52 0.69  
## 4 95.7 4708106240 4506411008 1 1.80 0.71  
## 5 95.7 4708106240 4506451968 1 1.80 0.71  
## 6 95.7 4708106240 4506411008 1 1.80 0.71  
## load\_min5 mem\_active mem\_available mem\_buffers mem\_cached mem\_free  
## 1 1.33 368939008 917688320 2158592 361664512 917688320  
## 2 1.33 372154368 914485248 2158592 361693184 914485248  
## 3 1.33 372920320 913903616 2158592 362090496 913903616  
## 4 1.39 379072512 907665408 2158592 362209280 907665408  
## 5 1.39 381206528 905572352 2158592 362266624 905572352  
## 6 1.39 381227008 905592832 2158592 362287104 905592832  
## mem\_inactive mem\_percent mem\_shared mem\_total mem\_used memswap\_free  
## 1 240955392 76.9 9035776 3973603328 3055915008 645918720  
## 2 240943104 77.0 9035776 3973603328 3059118080 645918720  
## 3 241266688 77.0 9035776 3973603328 3059699712 645918720  
## 4 241238016 77.2 9035776 3973603328 3065937920 645918720  
## 5 241274880 77.2 9035776 3973603328 3068030976 645918720  
## 6 241278976 77.2 9035776 3973603328 3068010496 645918720  
## memswap\_percent memswap\_sin memswap\_sout memswap\_total memswap\_used  
## 1 0 0 0 645918720 0  
## 2 0 0 0 645918720 0  
## 3 0 0 0 645918720 0  
## 4 0 0 0 645918720 0  
## 5 0 0 0 645918720 0  
## 6 0 0 0 645918720 0  
## network\_lo\_cumulative\_cx network\_lo\_cumulative\_rx network\_lo\_cumulative\_tx  
## 1 400 200 200  
## 2 400 200 200  
## 3 400 200 200  
## 4 400 200 200  
## 5 400 200 200  
## 6 400 200 200  
## network\_lo\_cx network\_lo\_interface\_name network\_lo\_key network\_lo\_rx  
## 1 200 lo interface\_name 100  
## 2 0 lo interface\_name 0  
## 3 0 lo interface\_name 0  
## 4 0 lo interface\_name 0  
## 5 0 lo interface\_name 0  
## 6 0 lo interface\_name 0  
## network\_lo\_time\_since\_update network\_lo\_tx percpu\_0\_cpu\_number percpu\_0\_guest  
## 1 1.000000 100 0 0  
## 2 1.022948 0 0 0  
## 3 1.024724 0 0 0  
## 4 1.028685 0 0 0  
## 5 1.018667 0 0 0  
## 6 1.024217 0 0 0  
## percpu\_0\_guest\_nice percpu\_0\_idle percpu\_0\_iowait percpu\_0\_irq percpu\_0\_key  
## 1 0 0 0 0 cpu\_number  
## 2 0 0 0 0 cpu\_number  
## 3 0 0 0 0 cpu\_number  
## 4 0 0 0 0 cpu\_number  
## 5 0 0 0 0 cpu\_number  
## 6 0 0 0 0 cpu\_number  
## percpu\_0\_nice percpu\_0\_softirq percpu\_0\_steal percpu\_0\_system percpu\_0\_total  
## 1 0 1 0 1 100  
## 2 0 0 0 3 100  
## 3 0 0 0 2 100  
## 4 0 0 0 3 100  
## 5 0 0 0 1 100  
## 6 0 0 0 1 100  
## percpu\_0\_user processcount\_running processcount\_sleeping processcount\_thread  
## 1 9 2 111 154  
## 2 45 1 112 154  
## 3 40 2 110 153  
## 4 42 3 109 153  
## 5 37 3 109 153  
## 6 39 2 110 153  
## processcount\_total system\_hostname system\_hr\_name  
## 1 113 localhost.localdomain CentOS Linux 7.7.1908 64bit  
## 2 113 localhost.localdomain CentOS Linux 7.7.1908 64bit  
## 3 112 localhost.localdomain CentOS Linux 7.7.1908 64bit  
## 4 112 localhost.localdomain CentOS Linux 7.7.1908 64bit  
## 5 112 localhost.localdomain CentOS Linux 7.7.1908 64bit  
## 6 112 localhost.localdomain CentOS Linux 7.7.1908 64bit  
## system\_linux\_distro system\_os\_name system\_os\_version  
## 1 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 2 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 3 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 4 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 5 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 6 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## system\_platform timestamp  
## 1 64bit 2020-03-20 09:16:03  
## 2 64bit 2020-03-20 09:16:05  
## 3 64bit 2020-03-20 09:16:06  
## 4 64bit 2020-03-20 09:16:07  
## 5 64bit 2020-03-20 09:16:08  
## 6 64bit 2020-03-20 09:16:09

final\_normal\_data\_set <- read.csv("/home/anthony/Datasets/final-normal-data-set.csv")  
head(final\_normal\_data\_set)

## cpu\_guest cpu\_guest\_nice cpu\_idle cpu\_iowait cpu\_irq cpu\_nice cpu\_softirq  
## 1 0 0 0 0 0 0 0  
## 2 0 0 0 0 0 0 0  
## 3 0 0 0 0 0 0 0  
## 4 0 0 0 0 0 0 0  
## 5 0 0 0 0 0 0 0  
## 6 0 0 0 0 0 0 0  
## cpu\_steal cpu\_system cpu\_total cpu\_user diskio\_sda1\_disk\_name diskio\_sda1\_key  
## 1 0 5.0 100 21.0 sda1 disk\_name  
## 2 0 5.5 100 94.5 sda1 disk\_name  
## 3 0 5.5 100 94.5 sda1 disk\_name  
## 4 0 4.3 100 95.7 sda1 disk\_name  
## 5 0 5.0 100 95.0 sda1 disk\_name  
## 6 0 3.5 100 96.5 sda1 disk\_name  
## diskio\_sda1\_read\_bytes diskio\_sda1\_time\_since\_update diskio\_sda1\_write\_bytes  
## 1 0 1.000000 0  
## 2 0 1.388725 0  
## 3 0 1.419675 0  
## 4 0 1.456442 20480  
## 5 0 1.420813 270336  
## 6 0 1.403237 0  
## diskio\_sda\_disk\_name diskio\_sda\_key diskio\_sda\_read\_bytes  
## 1 sda disk\_name 0  
## 2 sda disk\_name 0  
## 3 sda disk\_name 0  
## 4 sda disk\_name 0  
## 5 sda disk\_name 0  
## 6 sda disk\_name 0  
## diskio\_sda\_time\_since\_update diskio\_sda\_write\_bytes fs\_.\_device\_name  
## 1 1.000000 0 /dev/sda1  
## 2 1.388725 0 /dev/sda1  
## 3 1.419675 0 /dev/sda1  
## 4 1.456442 20480 /dev/sda1  
## 5 1.420813 270336 /dev/sda1  
## 6 1.403237 0 /dev/sda1  
## fs\_.\_free fs\_.\_fs\_type fs\_.\_key fs\_.\_mnt\_point fs\_.\_percent fs\_.\_size  
## 1 5680943104 xfs mnt\_point / 47 10725883904  
## 2 5680918528 xfs mnt\_point / 47 10725883904  
## 3 5680918528 xfs mnt\_point / 47 10725883904  
## 4 5680893952 xfs mnt\_point / 47 10725883904  
## 5 5680893952 xfs mnt\_point / 47 10725883904  
## 6 5680889856 xfs mnt\_point / 47 10725883904  
## fs\_.\_used load\_cpucore load\_min1 load\_min15 load\_min5 mem\_active  
## 1 5044940800 1 2.27 0.44 1.03 1261416448  
## 2 5044965376 1 2.57 0.47 1.11 1331392512  
## 3 5044965376 1 2.57 0.47 1.11 1371492352  
## 4 5044989952 1 2.57 0.47 1.11 1432678400  
## 5 5044989952 1 2.60 0.49 1.14 1464545280  
## 6 5044994048 1 2.60 0.49 1.14 1472520192  
## mem\_available mem\_buffers mem\_cached mem\_free mem\_inactive mem\_percent  
## 1 2992001024 0 2196631552 2992001024 943456256 19.3  
## 2 2921779200 0 2196697088 2921779200 943456256 21.2  
## 3 2881990656 0 2196701184 2881990656 943460352 22.3  
## 4 2820321280 0 2196701184 2820321280 943456256 24.0  
## 5 2788659200 0 2196705280 2788659200 943456256 24.8  
## 6 2780999680 0 2196705280 2780999680 943456256 25.0  
## mem\_shared mem\_total mem\_used memswap\_free memswap\_percent memswap\_sin  
## 1 9052160 3709415424 717414400 0 0 0  
## 2 9052160 3709415424 787636224 0 0 0  
## 3 9052160 3709415424 827424768 0 0 0  
## 4 9052160 3709415424 889094144 0 0 0  
## 5 9052160 3709415424 920756224 0 0 0  
## 6 9052160 3709415424 928415744 0 0 0  
## memswap\_sout memswap\_total memswap\_used network\_lo\_cumulative\_cx  
## 1 0 0 0 10936  
## 2 0 0 0 10936  
## 3 0 0 0 10936  
## 4 0 0 0 10936  
## 5 0 0 0 10936  
## 6 0 0 0 10936  
## network\_lo\_cumulative\_rx network\_lo\_cumulative\_tx network\_lo\_cx  
## 1 5468 5468 0  
## 2 5468 5468 0  
## 3 5468 5468 0  
## 4 5468 5468 0  
## 5 5468 5468 0  
## 6 5468 5468 0  
## network\_lo\_interface\_name network\_lo\_key network\_lo\_rx  
## 1 lo interface\_name 0  
## 2 lo interface\_name 0  
## 3 lo interface\_name 0  
## 4 lo interface\_name 0  
## 5 lo interface\_name 0  
## 6 lo interface\_name 0  
## network\_lo\_time\_since\_update network\_lo\_tx percpu\_0\_cpu\_number percpu\_0\_guest  
## 1 1.000000 0 0 0  
## 2 1.389067 0 0 0  
## 3 1.419202 0 0 0  
## 4 1.456856 0 0 0  
## 5 1.420603 0 0 0  
## 6 1.404292 0 0 0  
## percpu\_0\_guest\_nice percpu\_0\_idle percpu\_0\_iowait percpu\_0\_irq percpu\_0\_key  
## 1 0 0 0 0 cpu\_number  
## 2 0 0 0 0 cpu\_number  
## 3 0 0 0 0 cpu\_number  
## 4 0 0 0 0 cpu\_number  
## 5 0 0 0 0 cpu\_number  
## 6 0 0 0 0 cpu\_number  
## percpu\_0\_nice percpu\_0\_softirq percpu\_0\_steal percpu\_0\_system percpu\_0\_total  
## 1 0 0 0 3.0 100  
## 2 0 0 0 11.2 100  
## 3 0 0 0 6.2 100  
## 4 0 0 0 4.2 100  
## 5 0 0 0 4.9 100  
## 6 0 0 0 3.6 100  
## percpu\_0\_user processcount\_running processcount\_sleeping processcount\_thread  
## 1 8.0 2 120 155  
## 2 88.8 2 120 155  
## 3 93.8 2 120 155  
## 4 95.8 2 120 157  
## 5 95.1 2 120 155  
## 6 96.4 3 118 156  
## processcount\_total system\_hostname system\_hr\_name  
## 1 122 vm1-graph-analytics CentOS Linux 7.7.1908 64bit  
## 2 122 vm1-graph-analytics CentOS Linux 7.7.1908 64bit  
## 3 122 vm1-graph-analytics CentOS Linux 7.7.1908 64bit  
## 4 122 vm1-graph-analytics CentOS Linux 7.7.1908 64bit  
## 5 122 vm1-graph-analytics CentOS Linux 7.7.1908 64bit  
## 6 121 vm1-graph-analytics CentOS Linux 7.7.1908 64bit  
## system\_linux\_distro system\_os\_name system\_os\_version  
## 1 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 2 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 3 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 4 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 5 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## 6 CentOS Linux 7.7.1908 Linux 3.10.0-1062.12.1.el7.x86\_64  
## system\_platform timestamp  
## 1 64bit 2020-01-28 19:24:17  
## 2 64bit 2020-01-28 19:24:18  
## 3 64bit 2020-01-28 19:24:19  
## 4 64bit 2020-01-28 19:24:20  
## 5 64bit 2020-01-28 19:24:21  
## 6 64bit 2020-01-28 19:24:22

print("The column names of the final\_anormal\_data\_set")

## [1] "The column names of the final\_anormal\_data\_set"

colnames(final\_anormal\_data\_set)

## [1] "cpu\_guest" "cpu\_guest\_nice"   
## [3] "cpu\_idle" "cpu\_steal"   
## [5] "cpu\_iowait" "cpu\_irq"   
## [7] "cpu\_nice" "cpu\_softirq"   
## [9] "cpu\_system" "cpu\_total"   
## [11] "cpu\_user" "diskio\_sda1\_disk\_name"   
## [13] "diskio\_sda1\_key" "diskio\_sda1\_read\_bytes"   
## [15] "diskio\_sda1\_time\_since\_update" "diskio\_sda1\_write\_bytes"   
## [17] "diskio\_sda\_disk\_name" "diskio\_sda\_key"   
## [19] "diskio\_sda\_read\_bytes" "diskio\_sda\_time\_since\_update"   
## [21] "diskio\_sda\_write\_bytes" "fs\_.\_device\_name"   
## [23] "fs\_.\_free" "fs\_.\_fs\_type"   
## [25] "fs\_.\_key" "fs\_.\_mnt\_point"   
## [27] "fs\_.\_percent" "fs\_.\_size"   
## [29] "fs\_.\_used" "load\_cpucore"   
## [31] "load\_min1" "load\_min15"   
## [33] "load\_min5" "mem\_active"   
## [35] "mem\_available" "mem\_buffers"   
## [37] "mem\_cached" "mem\_free"   
## [39] "mem\_inactive" "mem\_percent"   
## [41] "mem\_shared" "mem\_total"   
## [43] "mem\_used" "memswap\_free"   
## [45] "memswap\_percent" "memswap\_sin"   
## [47] "memswap\_sout" "memswap\_total"   
## [49] "memswap\_used" "network\_lo\_cumulative\_cx"   
## [51] "network\_lo\_cumulative\_rx" "network\_lo\_cumulative\_tx"   
## [53] "network\_lo\_cx" "network\_lo\_interface\_name"   
## [55] "network\_lo\_key" "network\_lo\_rx"   
## [57] "network\_lo\_time\_since\_update" "network\_lo\_tx"   
## [59] "percpu\_0\_cpu\_number" "percpu\_0\_guest"   
## [61] "percpu\_0\_guest\_nice" "percpu\_0\_idle"   
## [63] "percpu\_0\_iowait" "percpu\_0\_irq"   
## [65] "percpu\_0\_key" "percpu\_0\_nice"   
## [67] "percpu\_0\_softirq" "percpu\_0\_steal"   
## [69] "percpu\_0\_system" "percpu\_0\_total"   
## [71] "percpu\_0\_user" "processcount\_running"   
## [73] "processcount\_sleeping" "processcount\_thread"   
## [75] "processcount\_total" "system\_hostname"   
## [77] "system\_hr\_name" "system\_linux\_distro"   
## [79] "system\_os\_name" "system\_os\_version"   
## [81] "system\_platform" "timestamp"

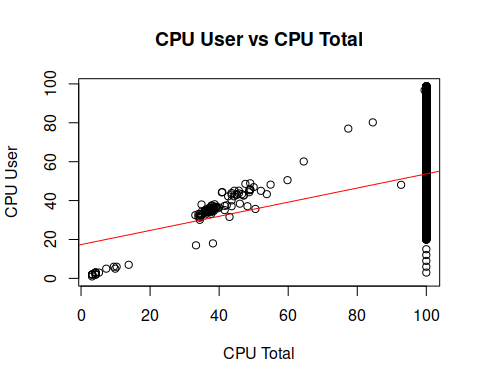
print("The column names of the final\_anormal\_data\_set")

## [1] "The column names of the final\_anormal\_data\_set"

colnames(final\_normal\_data\_set)

## [1] "cpu\_guest" "cpu\_guest\_nice"   
## [3] "cpu\_idle" "cpu\_iowait"   
## [5] "cpu\_irq" "cpu\_nice"   
## [7] "cpu\_softirq" "cpu\_steal"   
## [9] "cpu\_system" "cpu\_total"   
## [11] "cpu\_user" "diskio\_sda1\_disk\_name"   
## [13] "diskio\_sda1\_key" "diskio\_sda1\_read\_bytes"   
## [15] "diskio\_sda1\_time\_since\_update" "diskio\_sda1\_write\_bytes"   
## [17] "diskio\_sda\_disk\_name" "diskio\_sda\_key"   
## [19] "diskio\_sda\_read\_bytes" "diskio\_sda\_time\_since\_update"   
## [21] "diskio\_sda\_write\_bytes" "fs\_.\_device\_name"   
## [23] "fs\_.\_free" "fs\_.\_fs\_type"   
## [25] "fs\_.\_key" "fs\_.\_mnt\_point"   
## [27] "fs\_.\_percent" "fs\_.\_size"   
## [29] "fs\_.\_used" "load\_cpucore"   
## [31] "load\_min1" "load\_min15"   
## [33] "load\_min5" "mem\_active"   
## [35] "mem\_available" "mem\_buffers"   
## [37] "mem\_cached" "mem\_free"   
## [39] "mem\_inactive" "mem\_percent"   
## [41] "mem\_shared" "mem\_total"   
## [43] "mem\_used" "memswap\_free"   
## [45] "memswap\_percent" "memswap\_sin"   
## [47] "memswap\_sout" "memswap\_total"   
## [49] "memswap\_used" "network\_lo\_cumulative\_cx"   
## [51] "network\_lo\_cumulative\_rx" "network\_lo\_cumulative\_tx"   
## [53] "network\_lo\_cx" "network\_lo\_interface\_name"   
## [55] "network\_lo\_key" "network\_lo\_rx"   
## [57] "network\_lo\_time\_since\_update" "network\_lo\_tx"   
## [59] "percpu\_0\_cpu\_number" "percpu\_0\_guest"   
## [61] "percpu\_0\_guest\_nice" "percpu\_0\_idle"   
## [63] "percpu\_0\_iowait" "percpu\_0\_irq"   
## [65] "percpu\_0\_key" "percpu\_0\_nice"   
## [67] "percpu\_0\_softirq" "percpu\_0\_steal"   
## [69] "percpu\_0\_system" "percpu\_0\_total"   
## [71] "percpu\_0\_user" "processcount\_running"   
## [73] "processcount\_sleeping" "processcount\_thread"   
## [75] "processcount\_total" "system\_hostname"   
## [77] "system\_hr\_name" "system\_linux\_distro"   
## [79] "system\_os\_name" "system\_os\_version"   
## [81] "system\_platform" "timestamp"

plot(final\_anormal\_data\_set$cpu\_total, final\_anormal\_data\_set$cpu\_user,   
 main = "CPU User vs CPU Total",   
 xlab = "CPU Total",   
 ylab = "CPU User")  
  
# Fiting a linear model  
model <- lm(cpu\_user ~ cpu\_total, data = final\_anormal\_data\_set)  
  
#Adding the regression line  
abline(model, col = "red")



# the original dataset timestamp  
timestamp <- final\_anormal\_data\_set$timestamp  
timestamp2 <- final\_normal\_data\_set$timestamp

# converting character format to date format  
#ts\_timestamps <- as.POSIXct(final\_anormal\_data\_set$timestamp, format="%Y-%m-%d %H:%M:%S")  
#ts\_timestamps2 <- as.POSIXct(final\_normal\_data\_set$timestamp, format="%Y-%m-%d %H:%M:%S")

#final\_anormal\_data\_set$timestamp <- ts\_timestamps  
#final\_normal\_data\_set$timestamp <- ts\_timestamps2

# Checking for missing values  
sum(is.na(final\_anormal\_data\_set$cpu\_total))

## [1] 1

sum(is.na(final\_anormal\_data\_set$timestamp))

## [1] 0

# Removing rows with missing cpu\_total  
final\_anormal\_data\_set <- final\_anormal\_data\_set %>%   
 filter(!is.na(cpu\_total))

# Checking for missing values  
sum(is.na(final\_anormal\_data\_set$cpu\_total))

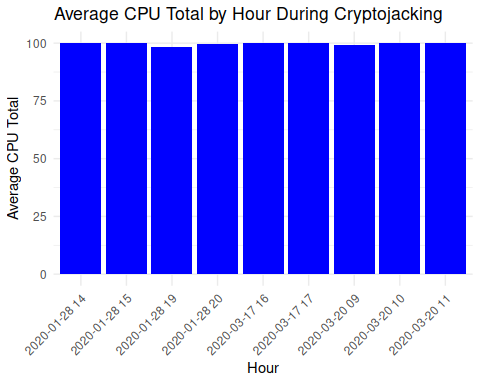
## [1] 0

sum(is.na(final\_anormal\_data\_set$timestamp))

## [1] 0

final\_anormal\_data\_set <- final\_anormal\_data\_set %>%  
 mutate(hour = format(as.POSIXct(timestamp), "%Y-%m-%d %H")) %>%  
 group\_by(hour) %>%  
 summarise(cpu\_total = mean(cpu\_total, na.rm = TRUE))

ggplot(final\_anormal\_data\_set, aes(x = hour, y = cpu\_total)) +  
 geom\_bar(stat = "identity", fill = 'blue') +  
 labs(title = "Average CPU Total by Hour During Cryptojacking",  
 x = 'Hour',  
 y = "Average CPU Total") +  
 theme\_minimal() +  
 theme(axis.text.x = element\_text(angle = 45, hjust = 1))



# Filling NA values in cpu\_total with 0 using base R  
final\_normal\_data\_set$cpu\_total[is.na(final\_normal\_data\_set$cpu\_total)] <- 0

# Creating a time series object  
cpu\_ts <- ts(final\_normal\_data\_set$cpu\_total, frequency = 12)  
# Decomposing the time series  
decomposed\_ts <- decompose(cpu\_ts)  
# Ploting the decomposed components  
plot(decomposed\_ts)

