1_proc_HPP

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```r
library(tidyverse)
library(ggplot2)
```

```r
set.seed(1) # for reproducibility

t_max <- 10
t <- 0

lmbda <- 10

X <- numeric(0) # vector of t

while(t <= t_max){
  u       <- runif(1)
  t       <-  t - log(u)/lmbda              # t ~ exp(1/lambda)
  if(t < t_max) {
    X <- c(X,t)                             # update index
  }
}
```
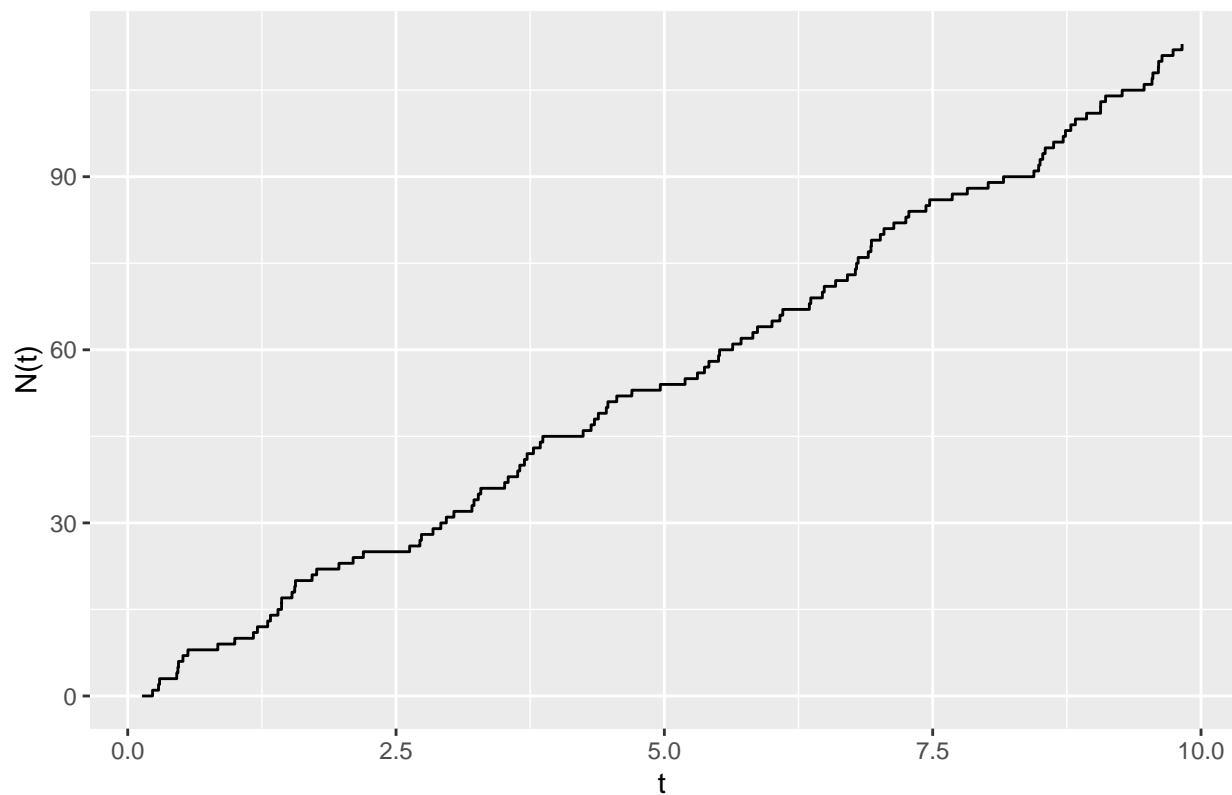
```r
length(X)
```

```
## [1] 114
```

```r
df_HPP = tibble(
  x = X,
  y = 0:(length(X) - 1)
)

p_HPP <- ggplot(data=df_HPP, mapping=aes(x=x, y=y)) +
  geom_step() +
  labs(title = "Homogeneous Poisson Process lambda = ",
       x = "t",
       y = "N(t)")
p_HPP
```
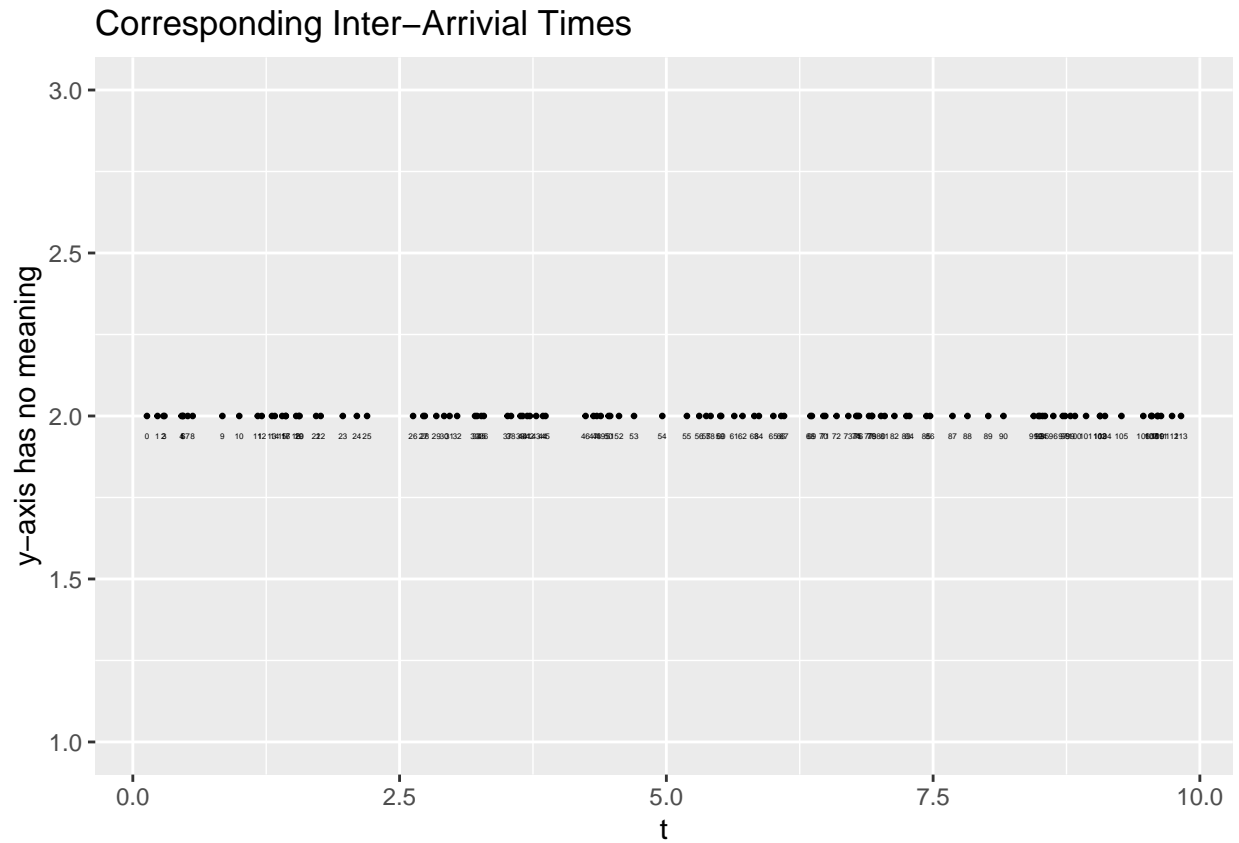
Homogeneous Poisson Process lambda =


```r
# Plot time plot
df_HPP <- df_HPP %>% add_column(
  t_fix = rep(2, length(df_HPP$x))
)

p_HPP_time <- ggplot(data=df_HPP, mapping=aes(x=x, y=t_fix, label = y)) +
  geom_point(size=0.5) +
  ylim(c(1,3)) +
  labs(title = "Corresponding Inter-Arrivial Times",
       x = "t",
       y = "y-axis has no meaning") +
  geom_text(vjust=4, size=1)

p_HPP_time
```

Corresponding Inter-Arrivial Times


```r
require(gridExtra)
```

```
## Loading required package: gridExtra
```

```
##
## Attaching package: 'gridExtra'
```
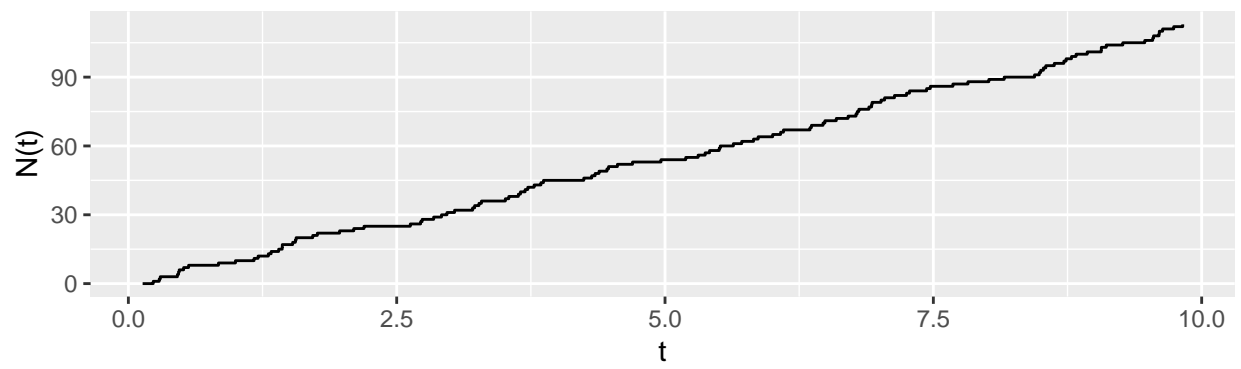
```
## The following object is masked from 'package:dplyr':
##
##     combine
```

```r
grid.arrange(p_HPP, p_HPP_time)
```

Homogeneous Poisson Process lambda =

Corresponding Inter−Arrivial Times