

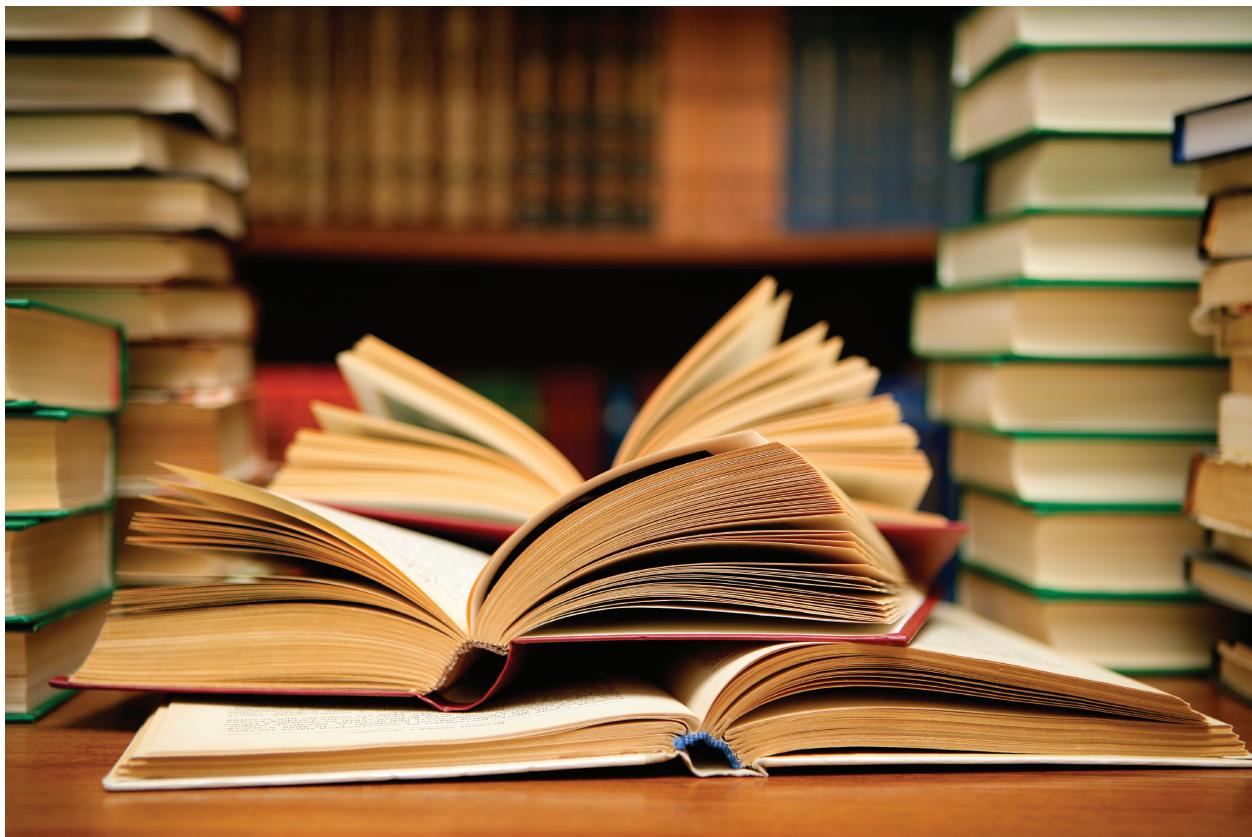
# HW1\_Sloppy\_Printer

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Sloppy Pinter Problem -

```
#Adding image
image_book = 'https://elgarblog.files.wordpress.com/2014/01/education-books.jpg'
if (!file.exists(image <- 'education-books.jpg'))
  download.file(image_book,image,mode = 'wb')
knitr:::include_graphics(if(identical(knitr:::pandoc_to(), 'html')) image_book else image)
```



Step 1. Explore the Poisson distribution by using “rpois” in R:

$$\text{Poisson Distribution} - P(x) = \frac{e^{-\lambda} \lambda^x}{x!}$$

We have already known the lamda =2, and we assume n=500 (since most books doesn't have pages more than 500). We get the estimated range of the distribution is [0,7] (by observing the outcomes), therefore, I decide to set “n”(number of misprints) up to 7, and “p”(number of pages of a book) up to 500.

Step 2. Conducting simulations in R.

```
#Randomly select pages for ten books and sort the outcome
set.seed(2018)
p <- c(sort(ceiling(runif(10,100,500))))
#Specify the range of number of misprints
```

```

n <- c(as.integer(0:7))

#Create temporary tables for storing data points in loop
temptab <- c()
over_n <- c()

#Calculate number of errors for each pages and how many pages has errors larger than n
for (i in 1:10) {
  for (k in 1:8) {
    n_misp <- rpois(p[i], 2)
    over_n[k] <- sum(n[k] < n_misp)
  }
  temptab <- cbind(temptab, over_n)
}

#Build a data frame and transfer data from the temporary table to here.
sumtab <- as.data.frame(temptab, row.names = n)
header <- paste(p, "pages", sep = "")
colnames(sumtab) = header

#Refine the table by using Kable
kable(sumtab)

```

	125pages	153pages	179pages	221pages	235pages	286pages	290pages	319pages	343pages	484pages
0	108	131	149	188	213	253	245	272	290	412
1	76	93	111	128	148	188	170	193	213	290
2	40	47	68	63	68	95	92	106	112	158
3	27	24	28	28	40	41	43	38	44	87
4	1	4	7	8	14	12	18	14	22	45
5	2	0	4	1	5	2	4	6	2	9
6	0	1	0	1	0	0	0	1	4	3
7	0	0	0	0	1	0	0	0	0	2