# Sri Lanka Institute of Information Technology


## Lab Submission
## Lab sheet No.07

**IT24102009**

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**Probability and Statistics | IT2120**

B.Sc. (Hons) in Information Technology

## Exercise

**Instructions:** Create a folder in your desktop with your registration number (Eg: IT. . . . . ." ). You need to save the R script file and take screenshots of the command prompt with answers and save it in a word document inside the folder. Save both R script file and word document with your registration number (Eg: "IT. . . . . .." ). After you finish the exercise, zip the folder and upload the zip file to the submission link.

1. A train arrives at a station uniformly between 8:00 a.m. and 8:40 a.m. Let the random variable X represent the number of minutes the train arrives after 8:00 a.m. What is the probability that the train arrives between 8:10 a.m. and 8:25 a.m.?

```
> ### (1)
> ## (10 < X < 25) = (25 <= X) - (10 <= X), min = 0, max = 40
> punif(25, min = 0, max = 40, lower.tail = TRUE) - punif(10, min = 0,
 max = 40, lower.tail = TRUE)
[1] 0.375
```

2. The time (in hours) to complete a software update is exponentially distributed with rate $\lambda = 1/3$. Find the probability that an update will take at most 2 hours.

```
> ### (2)
> ## (X <= 2), lamda = 0.3333
> pexp(2, rate = 0.3333, lower.tail = TRUE)
[1] 0.4865487
```

3. Suppose IQ scores are normally distributed with a mean of 100 and a standard deviation of 15.
   i. What is the probability that a randomly selected person has an IQ above 130?

```
> ### (3)
> ## (i)
> # (X > 130) = 1 - (X <= 130), mean = 100, sd = 15
> 1 - pnorm(130, mean = 100, sd = 15, lower.tail = TRUE)
[1] 0.02275013
```

   ii. What IQ score represents the 95th percentile?

```
> ## (ii)
> qnorm(0.95, mean = 100, sd = 15, lower.tail = TRUE)
[1] 124.6728
```