Probability and Statistics - IT2120

LAB 7

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```
> # 1. Train arrival
> a <- 0
> b <- 40
> prob1 <- (25 - 10) / (b - a)
> cat("Q1: Probability train arrives between 8:10 and 8:25 =", prob1, "\n")
Q1: Probability train arrives between 8:10 and 8:25 = 0.375
>
> # 2. Software update time
> lambda <- 1/3
> # P(X <= 2)
> prob2 <- pexp(2, rate=lambda)
> cat("Q2: Probability update takes at most 2 hours =", prob2, "\n")
Q2: Probability update takes at most 2 hours = 0.4865829
>
>
> # 3. IQ scores (Normal distribution)
> mean_iq <- 100
> sd_iq <- 15
>
> # (i) P(X > 130)
> prob3_i <- 1 - pnorm(130, mean=mean_iq, sd=sd_iq)
> cat("Q3(i): Probability IQ above 130 =", prob3_i, "\n")
Q3(i): Probability IQ above 130 = 0.02275013
>
> # (ii) 95th percentile (quantile)
> iq95 <- qnorm(0.95, mean=mean_iq, sd=sd_iq)
> cat("Q3(ii): IQ score at 95th percentile =", iq95, "\n")
Q3(ii): IQ score at 95th percentile = 124.6728
>
```

```r
# 1. Train arrival
a <- 0
b <- 40
prob1 <- (25 - 10) / (b - a)
cat("Q1: Probability train arrives between 8:10 and 8:25 =", prob1, "\n")

# 2. Software update time
lambda <- 1/3
# P(X <= 2)
prob2 <- pexp(2, rate=lambda)
cat("Q2: Probability update takes at most 2 hours =", prob2, "\n")


# 3. IQ scores (Normal distribution)
mean_iq <- 100
sd_iq <- 15

# (i) P(X > 130)
prob3_i <- 1 - pnorm(130, mean=mean_iq, sd=sd_iq)
cat("Q3(i): Probability IQ above 130 =", prob3_i, "\n")

# (ii) 95th percentile (quantile)
iq95 <- qnorm(0.95, mean=mean_iq, sd=sd_iq)
cat("Q3(ii): IQ score at 95th percentile =", iq95, "\n")
```

a	0
b	40
iq95	124.672804404272
lambda	0.333333333333333
mean_iq	100
prob1	0.375
prob2	0.486582880967408
prob3_i	0.0227501319481792
sd_iq	15