L2F Lab 7: Confidence Intervals of Proportion

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Question 1 (a) & (b)

```
# Question 1(a)
82/100
```

Question 1 (b) Hint: Use the formula: $\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$, where z^* is called the critical value. (See pre-reading materials for details).

You could use $z^* = 1.96$ for computing 95% confidence intervals. You may use the following command to compute confidence intervals. !!! REPLACE "p_hat" and "n" with your numbers below !!!

```
# Confidence inteval Lower bound
p_hat - 1.96 * sqrt( p_hat * (1 - p_hat) / n)
# Confidence inteval Upper bound
p_hat + 1.96 * sqrt( p_hat * (1 - p_hat) / n)
```

Question 2 (b)

```r
# First simulate 1500 samples from binomial distribution
samples <- rbinom(n = 1500, size = 100, prob = 0.8)
# Find the estimated proportions ("p hat") for each sample
p_hat <- samples/100
# Find 95% confidence intervals for each "p hat"
# Lower bound
CIs_lower <- p_hat - 1.96 * sqrt(p_hat * (1 - p_hat) / 100)
# Upper bound
CIs_upper <- p_hat + 1.96 * sqrt(p_hat * (1 - p_hat) / 100)
```

Question 2 (d)

```r
# Whether confidence intervals contain
# the true proportion 0.8 or not
ifcontain <- ifelse(0.8 > CIs_lower &  0.8 < CIs_upper, 1, 0)
# Count the actual number of "contained"
sum(ifcontain)
# The proportion of "contained"
sum(ifcontain)/1500
```