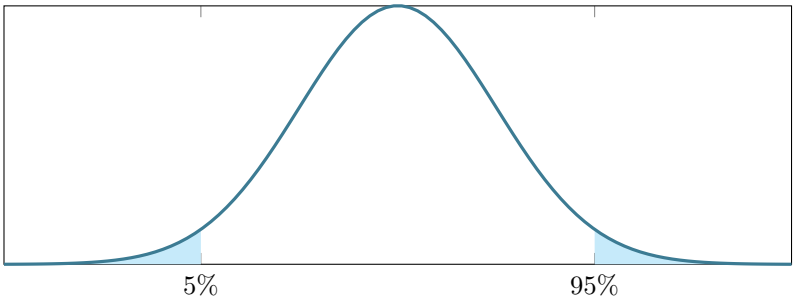
Hypothesis testing

1 Performing a hypothesis test

Method	Example
Establish the null and alternative hypothesis (H_0 and H_1)	$H_0 : p = 0.5$ $H_1 : p > 0.5$
Define the distribution under H_0	Under H_0 $X \sim B(15, 0.5)$
Decide on the significance level	5%
Collect data, state the test statistic	X=12
Calculate the probability of obtaining the test statistic or a more extreme result	$P(X \geqslant 12) = 1 - P(X \leqslant 11)$ $= 1 - 0.9824$ $= 0.0176$
Compare this to the sig level as a decimal	$0.0176 < 0.05$
Interpret the results in terms of the original claim	There is evidence to reject H_0 in favour of H_1. The test is significant.

2 Finding the critical region



If the test statistic is found in the critical region H_0 will be rejected

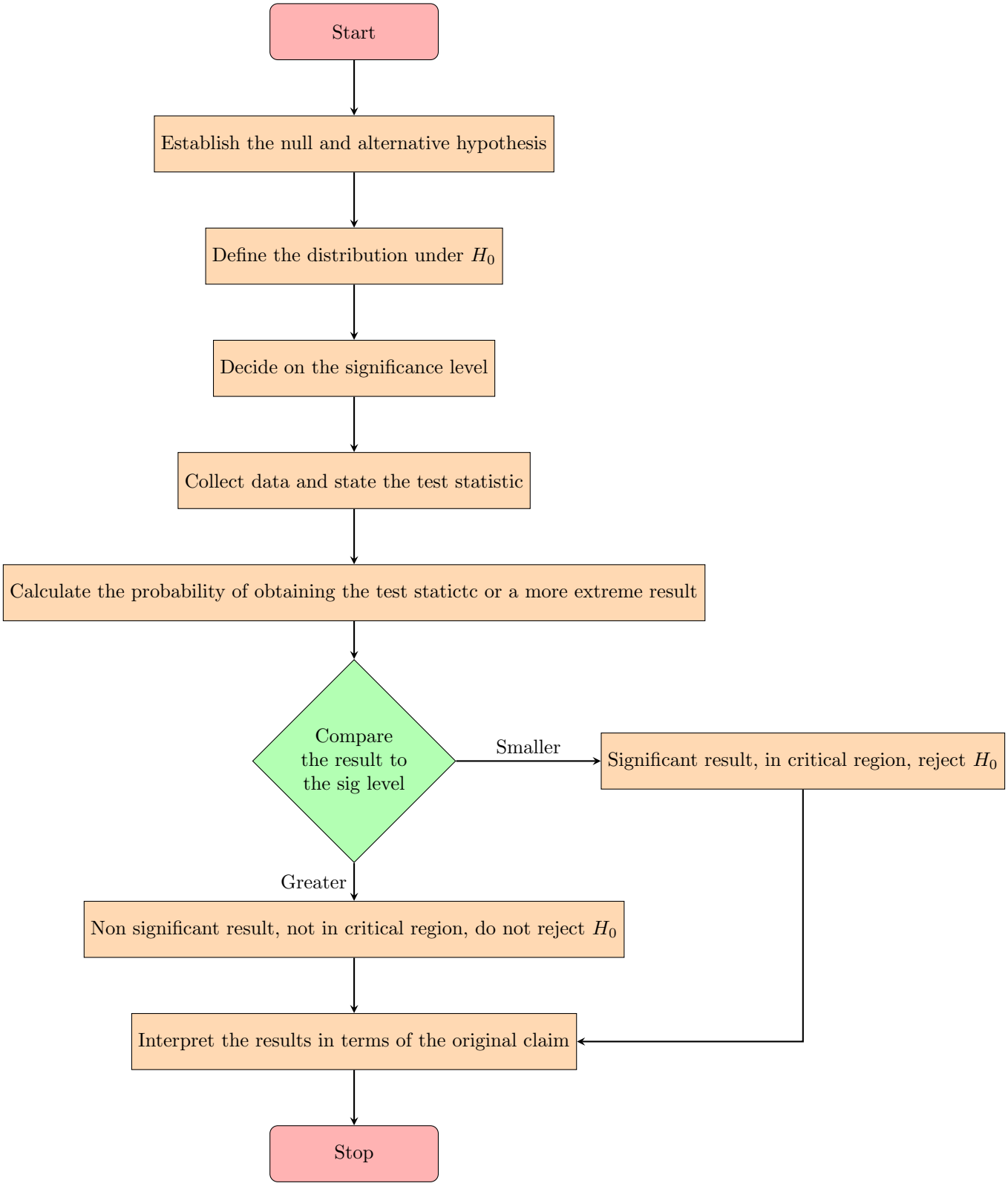
2.1 Finding the Lower critical value

$P(X \geqslant c) < 0.95$
$1 - P(X \leqslant c - 1) < 0.95$
$\mathbf{P(X \leqslant c - 1) > 0.05}$

2.2 Finding the Upper critical value

$P(X \geqslant c) < 0.05$
$1 - P(X \leqslant c - 1) < 0.05$
$\mathbf{P(X \leqslant c - 1) > 0.95}$

Then look these up in tables to find the critical values


Start
Establish the null and alternative hypothesis
Define the distribution under H_0
Decide on the significance level
Collect data and state the test statistic
Calculate the probability of obtaining the test statictc or a more extreme result
Compare the result to the sig level
Smaller
Significant result, in critical region, reject H_0
Greater
Non significant result, not in critical region, do not reject H_0
Interpret the results in terms of the original claim
Stop