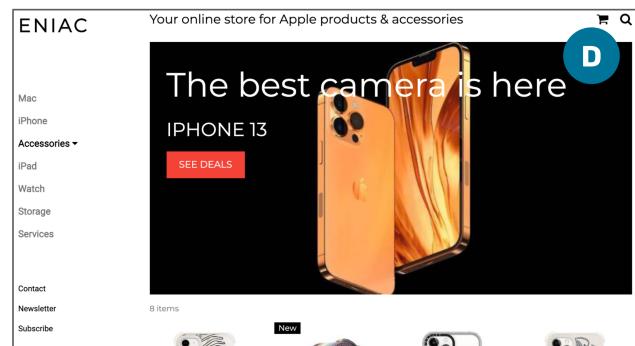
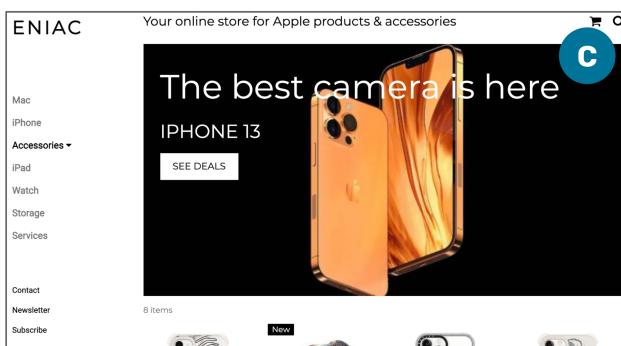
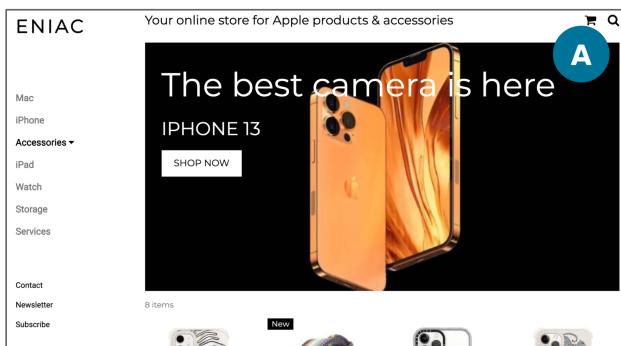




Eniac's need for A/B Testing

Designing Eniac's A/B Test

With the goal of increasing the conversion rate of the “SHOP NOW” button (when a conversion is a “click”, you might see the term “click-through rate”, abbreviated **CTR**, used instead of conversion rate), Marketing has asked the Design team for a redesign of the button, and end up with the original plus three different versions:



Let's see what changed in each version:

- Version A: the original site.
- Version B: the SHOP NOW button is now red.
- Version C: the SHOP NOW button has a new text, “SEE DEALS”
- Version D: both the B and the C changes to the button have been applied.

In an A/B test, we compare the performance of two or more versions of a site.

Case study: Eniac's A/B Test

This is what the homepage currently looks like:

The screenshot shows the current homepage of ENIAC, an online store for Apple products & accessories. The top navigation bar includes links for Mac, iPhone, Accessories (with sub-links for Chargers & Cables, iPhone Accessories, Watch Accessories, Mac Accessories, AirTag), iPad, Watch, Storage, Services, Contact, Newsletter, and Subscribe. The search bar is located at the top right.

The main banner features two iPhone 13 phones with the text "The best camera is here" and a "SHOP NOW" button. Below the banner is a grid of 8 items, each with a small image and a price:

- Abstract iPhone case: 24,99€
- Pride Watch strap: 19,99€
- Mushrooms iPhone case: 20,50€
- Leopard iPhone case: 14,99€
- AirPods: 159,99€
- Blue Watch strap: 20,50€
- Hermes iPhone case: 349,99€
- Mag-Safe iPhone case: 24,99€

The footer section includes a "Subscribe" form with fields for Name, Email, and a "Subscribe" button. It also contains links for Contact (Questions? Go ahead.), About (About us, We're hiring, Support, Find store, Shipment, Payment, Gift card, Return, Help), and Store (Company Name, Address, Email, We accept payment methods: Amex, Credit Card, and social media links: Facebook, Instagram, Pinterest, Twitter, LinkedIn). The footer also mentions "Powered by w3.css".

The white “SHOP NOW” button takes pride of place in the primary banner, but only attracts about 2% of users, as determined by click-

through rate (CTR), a common term in Online Marketing which typically describes the number of clicks an ad receives divided by the number of times the ad is shown. Here, click-through rate is measured as the number of clicks a website element receives divided by the total number of visits on the website. The report from the team analysing the website shows the specific numbers and explains how they reacted to them:

During the sample period from October 13, 2021 – October 20, 2021, which included 50,061 visits to the homepage, just under 2% of users clicked “SHOP NOW”. This did attract about twice the number of users as the “iPhone” link in the left sidebar, but contrasts with the surrounding banner itself, which gathered a CTR of roughly 3.5%. We asked ourselves if it may be visual features of the “SHOP NOW” button or if the text may feel simply too immediate a commitment to buying for users.

In an A/B Test, one of the tasks that usually belongs to the UX team is to perform user research and develop a new version of the website element that needs to be tested. The team conducted an anonymous user survey, showing a de-branded mock-up of the homepage and asking “What do you think and feel seeing this ‘SHOP NOW’ button on an online retailer’s website?” A few responses are recorded below:

Holly, 32:

- “I’m on a shopping site, so it seems pretty natural to me. I would probably click it if I knew which items it would take me to.”

Ed, 57:

- “I like to do my research before I put anything in a basket. I’d like to see some product specs before I’m ready to ‘shop’.”

V., 16

- “Seems a little unnecessary. I came here to shop, so why is the website telling me to shop?”

Based on the feedback and reviewing some successful colour choices from previous ad-campaigns, the UX team asked web-design for the three new variations.

Explore the data from the experiment

Finally, the decision was reached to test all four versions of the button:

- White “SHOP NOW”
- Red “SHOP NOW”
- White “SEE DEALS”
- Red “SEE DEALS”

The metrics that were deemed relevant enough to be tracked were the following:

- **Click-through rate (CTR) for the homepage.** Amount of clicks on the button divided by the total visits to the page. Selected as a measure of the initial ability of a website element to lead users to interact with it.
- **Drop-off rate for the linked page.** This metric represents the percentage of visitors who initiate a conversion process (such as a purchase or sign-up) but do not complete it. It serves as an indicator of how engaged users remain at any point in the conversion process. A lower drop-off rate is preferable, as it suggests a higher likelihood of users completing the desired action.
- **Homepage-return rate for the category pages.** Measures how often users return to the homepage after clicking the button. Similarly to the drop-off rate, this metric helps us infer whether users are finding what they need after clicking the tested element. If they frequently return to the homepage, it suggests they might not be finding the desired information on the linked page. As such, the homepage-return rate serves as

a useful indicator of how well the button leads users to the desired content. Ideally, we want to minimize the homepage-return rate, which would indicate that users are finding what they need on the first try.

While all the metrics will be relevant for the decision-making process, it was decided that for a version to be considered superior, **there must be statistical significance in the click-through rate**.

The hypotheses to be tested in the experiment are the following:

- **Null Hypothesis:** all versions have the same CTR.
- **Alternative Hypothesis:** there is a difference in the CTR for the different versions.

A typical statistical significance of 95% was chosen. Minimum detectable effect was set to 20%, it having been determined that even a small increase in the conversion pipeline would cover the costs of a small change to the website.

Currently, the CTR for the “SHOP NOW” button sits at around 2%, and the page has an average 7142 per day. With these numbers, [a power calculator like this one](#) can be used to decide on the length of the test. The length of the test was extended to 14 days to cover a full 2 business cycles:

The screenshot shows a user interface for calculating sample size. On the left, there are four input fields with question marks: "Conversion Rate [?]" (2 %), "Minimum Detectable Effect [?]" (20 %), "Statistical Significance [?]" (95 %), and "Statistical Power [?]" (80 %). To the right, a large blue button displays the result: "Required number of tested visitors per variation" (19,784).

How long should your A/B test run?

Our A/B test calculator also gives you an idea of the **duration of your A/B test**. For this **test duration calculator** to work, please fill in the information above, as well as your average daily traffic on the tested page, and your number of variations – including the control version. Read more about [confidence intervals and methods to interpret test results](#).

The screenshot shows a user interface for calculating test duration. On the left, there are two input fields with question marks: "Average Daily Visitors [?]" (7142) and "Number of Variations [?]" (4). To the right, a large blue button displays the result: "Required duration in days" (11).

The test ran between November 2, 2021, and November 16, 2021. Even though all tools to set up online experiments already perform the statistical test for you, we will download the data and perform the test with Python for learning purposes.



Explore the data and answer these questions:

- What was the click-through rate for each version?
- Which version was the winner?
- Do the results seem conclusive?