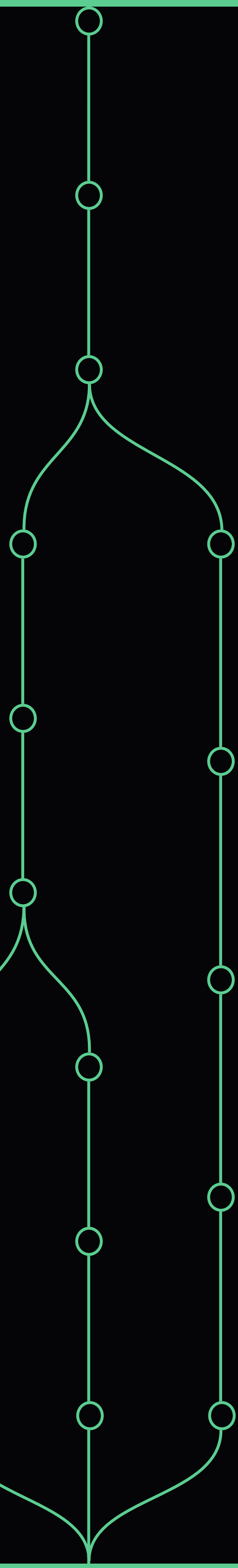
Race 00

Half Marathon Full Stack

March 1, 2025



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Engage

DESCRIPTION

Welcome to the team challenge!

You've really completed five Sprints on this Half Marathon Full Stack!
We hope that you have done tasks very well and that you have enough time to absorb the new information.

Now it's time to merge all the knowledge from Sprints into one challenge. The simplest way to practice is to create a calculator.

Let's practice!

BIG IDEA

Combine knowledge.

ESSENTIAL QUESTION

How to organize the pooling of skills and knowledge?

CHALLENGE

Combine the knowledge gained by your teammate to create a working program.

Investigate

GUIDING QUESTIONS

We invite you to find answers to the following questions. By researching and answering them, you will gain the knowledge necessary to complete the challenge. To find solutions, ask the students around you and search the internet. We encourage you to ask as many questions as possible. Note down your findings and discuss them with your peers.

- What experience have you already got during the past five Sprints?
- Which topics were easier to understand? Which topics are more difficult?
- What do you like to work more with: `HTML+CSS` or `JavaScript`?
- What tools are there to better organize collaboration?
- What do you want your calculator to look like (UI - user interface)?
- How will the user interact with the calculator (UX - user experience)?
  What functionality do you need to add?
- How can you check your website for cross-browser compatibility across different operating systems?

GUIDING ACTIVITIES

Complete the following activities. Don't forget that you have limited time to overcome the challenge. Use it wisely. Distribute tasks correctly.

- Read the story.
- Meet with your teammate. Discuss teamwork organization, communication, workflow.
- Create a work plan for this challenge. Make sure every member of the team understands what to do.
- Brainstorm ways to make your program actually useful for the user.
- Think about design.
- Distribute tasks.
- Clone your git repository that is issued on the challenge page.
- Start to develop the solution. Offer improvements. Test your code.
- Try to choose the best solutions.
- Remember to test your web app for cross-browser compatibility.
- Explore new things.
- Communicate with the team on a daily basis, share information on time.

ANALYSIS

Analyze your findings. What conclusions have you made after completing guiding questions and activities? In addition to your thoughts and conclusions, here are some more analysis results.

- Challenge has to be carried out by the entire team.
- Each team member must understand the challenge and realization, and be able to reproduce it individually.
- It is your responsibility to assemble the whole team. Phone calls, SMS, messengers are good ways to stay in touch.
- You can proceed to `Act: Creative` only after you have completed all requirements in `Act: Basic`. But before you begin to complete the challenge, pay attention to the program's architecture. Take into account the fact that many features indicated in the `Act: Creative` require special architecture. And in order not to rewrite all the code somewhen, we recommend you initially determine what exactly you will do in the future.
- Be attentive to all statements of the story.
- Analyze all information you have collected during the preparation stages.
- Submit your files using the layout described in the story. Only useful files allowed, garbage shall not pass!
- Pay attention to what is allowed. Use of forbidden stuff is considered a cheat and your challenge will be failed.
- The web page in the browser must open through `index.html`.
- The scripts must be written outside the HTML file - in a separate JS file (script.js).
- You can always use the `Console` panel to test and catching errors.
- Complete tasks according to the rules specified in the following style guides:
    - HTML and CSS: Google HTML/CSS Style Guide. As per section 3.1.7 Optional Tags, it doesn't apply. Do not omit optional tags, such as `<head>` or `<body>`
    - JavaScript:
        - JavaScript Style Guide and Coding Conventions
        - JavaScript Best Practices
- The solution will be checked and graded by students like you. Peer-to-Peer learning.
- Your work may also be graded by your mentor. So, be ready for that.
- Also, the challenge will pass automatic evaluation which is called `Observer`.
- If you have any questions or don't understand something, ask other students or just Google it.

Act: Basic

NAME

Calculator

DIRECTORY

`./`

SUBMIT

`index.html, css/*.css, js/*.js`

ALLOWED

`HTML, CSS, JavaScript`

LEGEND

- All right. Look alive J.A.R.V.I.S.. It's play time. We've only got a couple days with this joystick so let's make the most of it. Update me on the structural and compositional analysis.
- The scepter is alien. There are elements I can't quantify.
- So there's elements you can.
- The jewel appears to be a protective housing for something inside. Something powerful.
- Like a reactor?
- Like a computer. I believe I'm ciphering code.

Tony Stark and J.A.R.V.I.S.

DESCRIPTION

Create a basic `Calculator`.
Implement your code within the standard of JavaScript – `ES2015 (or newer)`.

The main methods of the `Calculator` are:

- arithmetic operations +, -, *, ÷
- result =
- percent % (the result is a ratio to the current number expressed as a fraction of 100)
- reset C (reset result to default value)
- sign +/- (toggle positive/negative number)
- decimal point . (it is used to separate the integer part from the fractional part of a number written in decimal form)

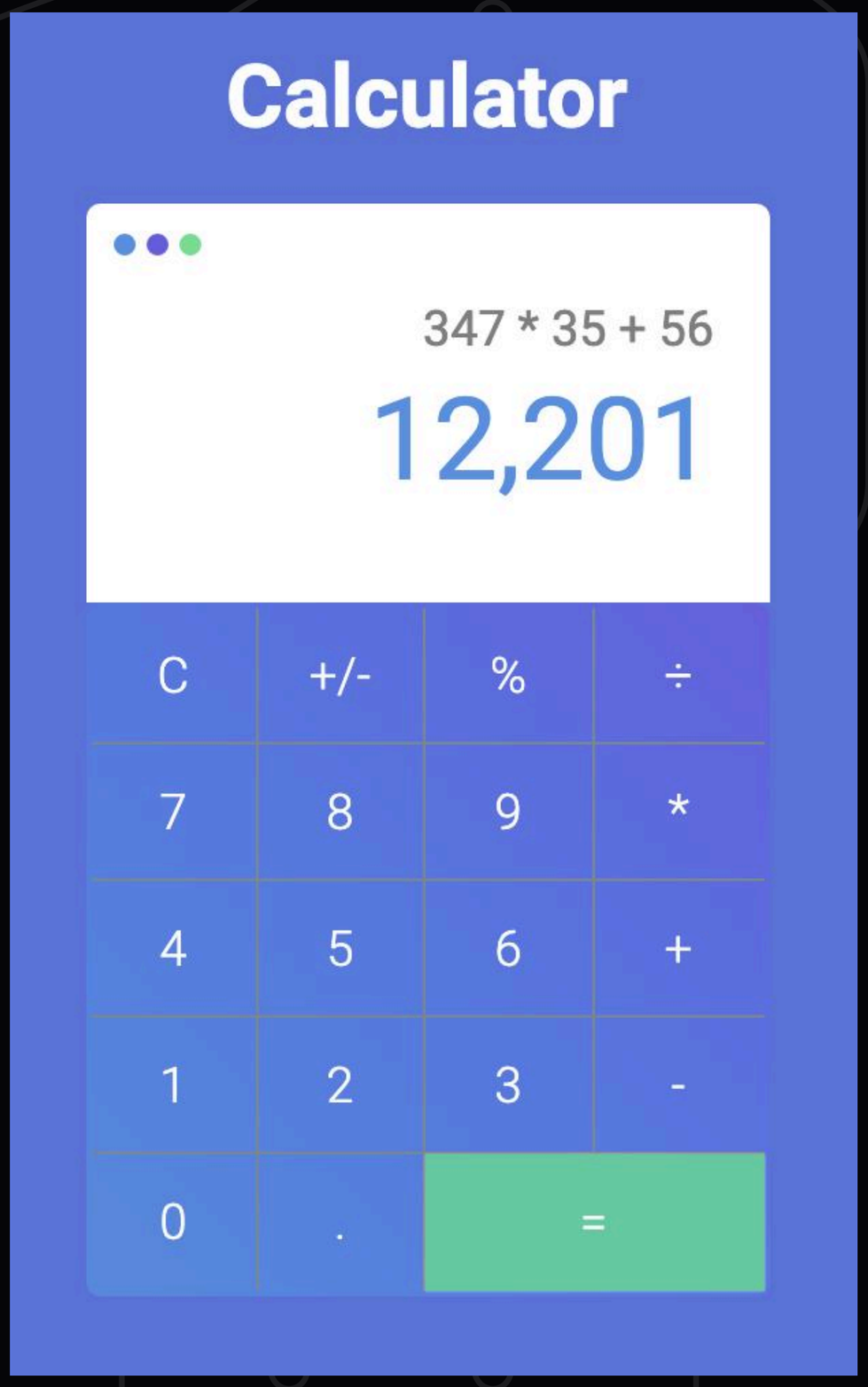
Your `Calculator` must calculate as well as any calculator nowadays.

There are some characteristics of the correct `Calculator` (you can find out even more of them):

- default value in output field – 0
- default history field – is empty
- signs or numbers of the current value are added to output field

Design and UX/UI are up to you. You can find inspiration by taking a look at the example below.
The program must not perform mathematical operations with strings but only work with numbers.

EXAMPLE



Act: Creative

DESCRIPTION

It is the place where your imagination and creativity play a significant role. Implement additional features to make the program better and more unique. Listed below are a few ideas you can add to your program. You can come up with everything you want to improve your program.
Creative features:

- factorial x! - a result of multiplying all positive integers less than or equal to the current number
- exponentiation x^n - a result of repeated multiplication of the base (could be a square, cube, n – don't hesitate to realize all of them)
- square root $\sqrt{x}$ - the result is a number that can be multiplied by itself to give the current number
- Memory Recall MR - adding a current number or result to memory
- Memory Clear MC - resetting memory
- Memory Operations M+, M- - operations with values in memory
- convert lenght – centimeters, kilometers, meters, etc.
- convert weights and masses - grams, kilograms, tonnes, etc.
- convert area - square centimeters, square kilometers, square meters, hectares, etc.
- implement calculations with numeral systems – binary, decimal, hexadecimal
- copying the history of calculations into the buffer and inserting from the buffer
- other creative features

Moreover, you can take an example of creating different modes from other `Calculator` implementations.

Share

DESCRIPTION

Last but not least, the final stage of your work is to publish it on LinkedIn in a form of post. This step isn't just about showcasing your work — it's a crucial part of Challenge Based Learning framework. During this stage, you will discover ways of getting external evaluation and feedback on your work. Analyzing your process helps you to understand your strengths and areas for improvement, while sharing your insights invites valuable feedback from peers and professionals.

Pay attention to details:

- aim to make your post both informative and reflective
- start by briefly introducing the challenge and its purpose
- highlight the key challenges you faced and the technologies or solutions you used to overcome them
- share any significant findings or lessons learned during the process
- conclude with a reflection on how this experience has prepared you for future work and invite others to share their thoughts

Helpful tools:

- Canva - a good way to visualize your data
- QuickTime or OBS - an easy way to capture your screen, record video or audio

Don’t forget to tag your post with #InnovationCampusKhPI to connect with the community! Follow and mention via @ Innovation Campus of NTU "KhPI"!