Default Mode

A tool for educators and learners that assesses Scratch projects, providing scores across various dimensions of computational thinking and identifying coding practices to enhance quality.

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Introduction

In Scratch programming, evaluating individual projects is essential for understanding the development of computational thinking skills.
For this reason, we developed the **Default Mode** in Dr. Scratch, which allows both educators and students to track progress and identify areas for improvement in computational thinking and programming practices.

Goals

With this mode we aim to achieve the following goals:

- **Provide Detailed Project Evaluation:** The Default Mode is designed to offer a comprehensive analysis of Scratch projects, highlighting strengths and weaknesses across key dimensions of computational thinking. This helps users identify areas of improvement in their projects and promotes better coding practices.
- **Support Multiple Evaluation Frameworks:** By offering both *Vanilla Mode* (0-3 points across 7 dimensions) and *Extended Mode* (0-4 points across 9 dimensions), this tool allows for flexible project evaluations that cater to different levels of detail and rigor.
- **Facilitate Progress Tracking:** Through consistent evaluation, the Default Mode enables users to track their progress over time, helping educators and learners alike understand how their computational thinking skills evolve with each project iteration.

How it works

Upload of the Scratch Projects

The first step in the process is the upload of the Scratch project, which can be done by two different ways:

- **Adding the Project URL:** Users can simply include the URL of their Scratch project which is a very easy and quick method in order to analyze a project.
- **Uploading the *.sb3* Project File:** Users can upload the *.sb3* file of their Scratch project, which can be useful when the users prefers to evaluate a specific version of the project.

Visualization of the Results

Once the project is uploaded, this mode processes the files and generates a detailed analysis, which is presented as follows:

Vanilla Mode

In the **Vanilla Mode** of Dr. Scratch, you will be able to see the following information:

- **Dimension Scores (0-3):** Each project is evaluated across seven core dimensions of computational thinking:
  - **Abstraction:** This dimension evaluates the use of procedures and modularization in the project.
  - **Parallelism:** Parallelism measures the ability to execute multiple tasks simultaneously.
  - **Logic:** This dimension assesses the use of logical operators (AND, OR, NOT, etc.) and conditions in the project.
  - **Synchronization:** Synchronization measures how well different scripts or sprites coordinate their actions.
  - **Flow Control:** This dimension evaluates the use of control structures like loops (e.g., repeat, repeat until, forever).

  - **User Interactivity:** This dimension looks at how the project responds to user input, such as key presses, mouse clicks, or other forms of interaction.
  - **Data Representation:** Data representation assesses how variables, lists, and other data structures are used to store and manipulate information.

- **Bad Habits:** The tool also detects and reports potential coding issues known as *Bad Habits*, which can hinder the quality and efficiency of a project. These Bad Habits are highlighted to encourage better coding practices:
  - **Duplicated Scripts:** This issue occurs when similar blocks of code are repeated unnecessarily within a project, leading to inefficiency and making the project harder to maintain.
  - **Sprite Naming:** Each sprite in a Scratch project should have a meaningful name. Projects that use default names like "Sprite1" or "Sprite2" are flagged, as poor naming conventions make the code harder to understand and manage.
  - **Backdrop Naming:** Similar to sprites, backdrops should also be meaningfully named. Using default names for backdrops (e.g., "backdrop1") is considered a bad habit, as it reduces the readability and organization of the project.
  - **Dead Code:** Dead code refers to scripts or blocks of code that are not executed during the project's runtime, so it is recommended to remove or rework dead code to keep the project clean and efficient.

- **Project Certificate:** Upon completion of the evaluation, a certificate is generated that summarizes the project's overall performance. This certificate can serve as a reflection of the user's progress and achievements in developing computational thinking skills.

- **Upload Zone for Comparison Mode:** Users are also provided with an option to upload another Scratch project, which can be compared to the current one using the **Comparison Mode**.

- **Recommender Assistant Zone:** Users are also provided with an option to access the **Recommender Assistant** by clicking the Image of the animal (Cat, Monkey or Ferret) of the Dashboard.

Extended Mode

In the **Extended Mode** of Dr. Scratch, you will find the same information as in the *Vanilla Mode*, but with some new features:

- **Dimension Scores (0-4):** Each project is evaluated across several core dimensions of computational thinking, with scores ranging from 0 to 4, instead of 0 to 3 as evaluated in the *Vanilla Mode*.

- **Two New Dimensions:** There are two new dimensions that are evaluated:
  - **Math Operators:** This dimension evaluates the use of mathematical operations (e.g., addition, subtraction, multiplication, division) within the project to perform calculations or modify values.
  - **Motion Operators:** This dimension measures how effectively the project utilizes motion-related blocks (e.g., move steps, point in direction) to manipulate sprite movement and positioning.

Usage Examples

Access from Main Page

In order to be able to use this mode, one of the options you can choose to do is to find the section in Dr.Scratch Main Page (Figure 1) and click the button of *Analyze by URL* or the button of *Analyze my Project*.

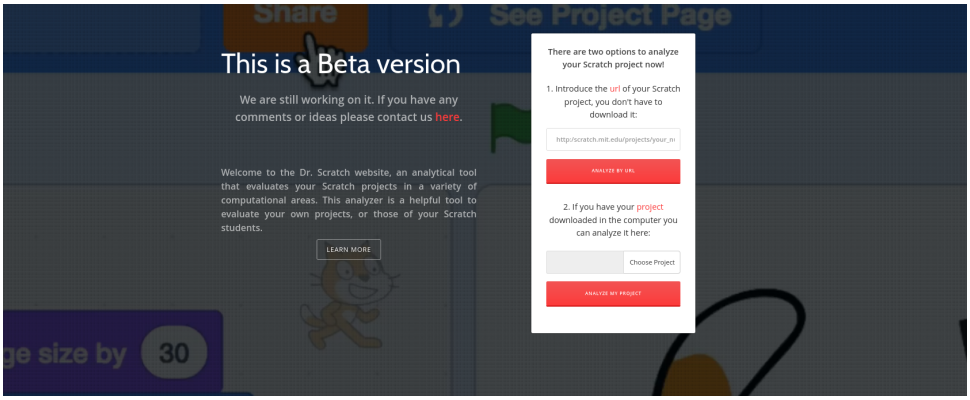

Figure 1: Default Mode Section in Dr.Scratch Main Page

Once you click on any of the previous buttons you will be redirect to the Dashboard with your Project Analyzed with the *Vanilla Mode* (Figure 2).

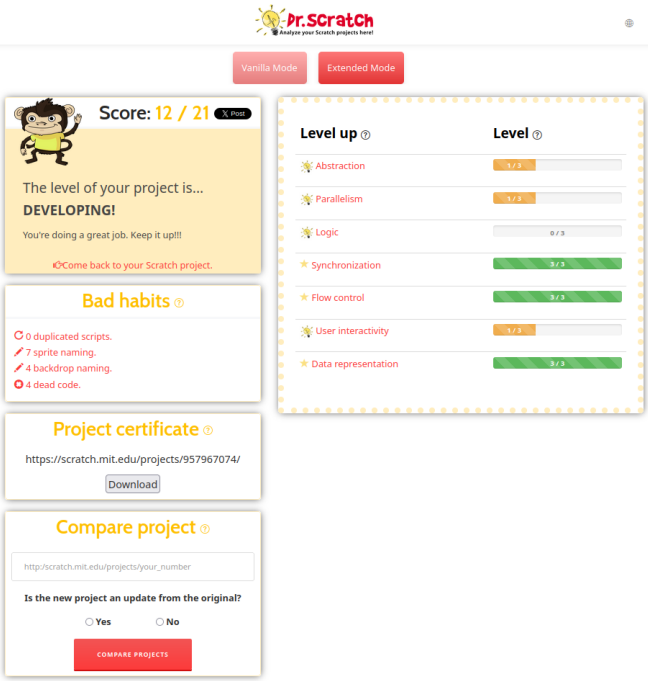

Figure 2: Vanilla Mode Section