PyCodEx

Overview

Enhancing Online Python Tutor, an existing Python Learning Tool, using **Multimodality**, **Visualisations**, **Interactivity** and **Reduced Context-Switching**, to make it more beginner friendly.

Multimodality and Reduced Context-Switching

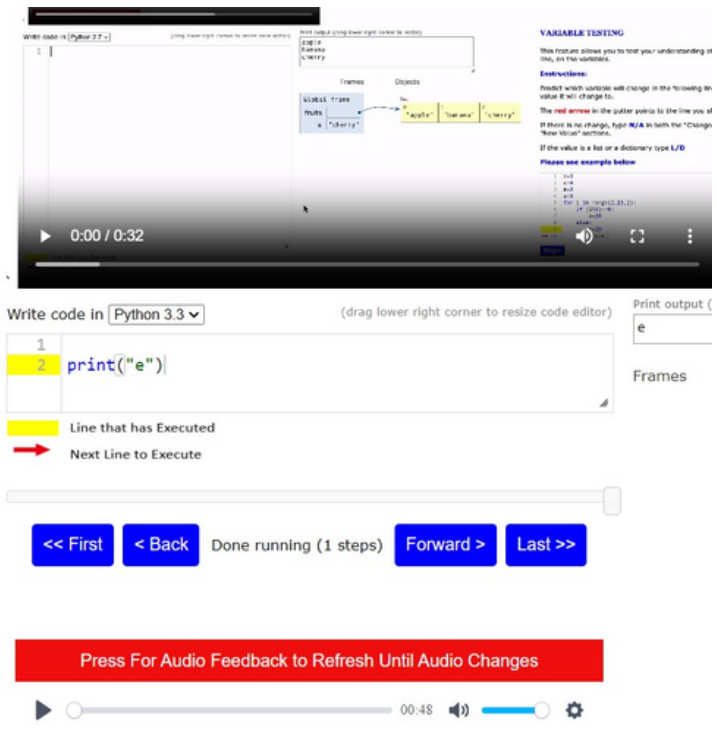
Aims

- **Audio explanation** for each code a student inputs in the code input plane.
- Append **lecture videos** to web application to **reduce context-switching** between tabs whilst practising.

Implementation

- **Spacy** Natural Language Processor for code explanations to human readable format.
- **Google text-to-speech** for audio.
- CSC1010H lecture videos.

Interface



Testing

- Students in **First year** extended degree courses.
- Testing methods includes **survey** completion and **observation** of usage.

Findings

- **Good Quality** Audio.
- Audio sounds **robotic** accent.
- Students expected the web application to assist with assignments, rather than to be for practising.

Conclusions

- **Enhanced engagement** in introductory programming courses.
- **Reduced context-switching** resulted in **smoother learning experience**.
- Positive impact of these innovations on user engagement.

Enhanced Visualisation and Interactivity

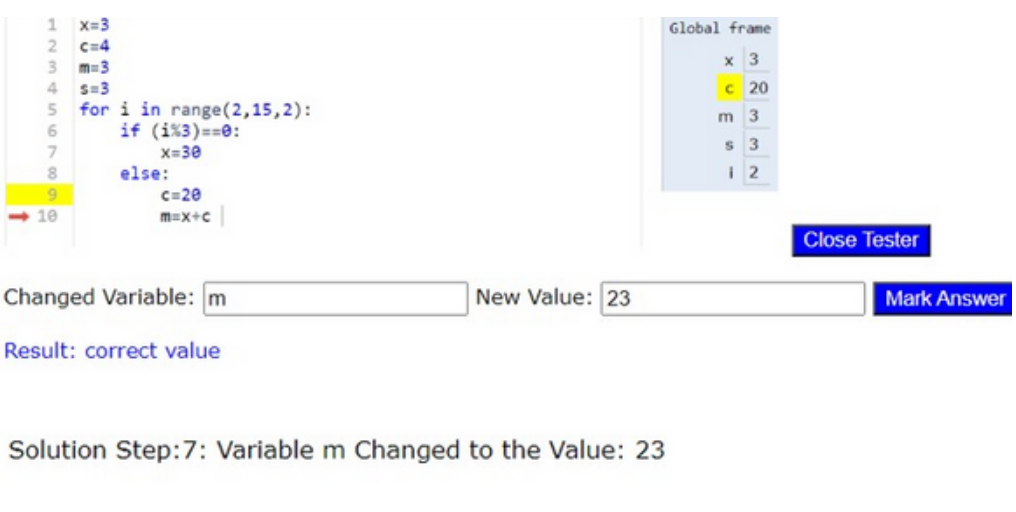
Aims

- Visualisation **highlights changing variables** in code line.
- **Variable Testing** to test understanding of each line of code.
- **Keyword Explanations** gives simple explanations of the Python syntax.

Implementation

- Changes were mainly made to the existing **Online Python Tutor** frontend programs.

Interface



Testing

- Students in **First year** extended degree courses.
- Testing methods includes **survey** completion and **observation** of usage.

Findings

- **Interactivity** feature was **helpful for debugging.**
- Highlighting feature was seen as being **helpful.**
- Keyword Explanations had **highest ratings.**

Conclusions

- Enhancements are better for individuals with **no experience.**
- General for need **better explanations** of Python Syntax.
- Interactivity and Visualisations **improve understanding** of code.

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