| **Session Objectives** | * To understand the purpose of while loops and when it can be helpful * To understand the use case of the input() function * To be able to use continue, break, and flags within a while loop |
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| **Key Points** | * The purpose of While loops and how to use them * Recap of int() function * Recap of input() function * How to let a user quit a program * Use case of flags (continue, break) * Using while loops with other concepts, such as lists and dictionaries |
| **Assessment** | * Via practical challenges - see task sheet below * Via in class modification of example codes and peer feedback |
| **Instructor Prep** | * **Note**: These session plans include sections where long explanations are provided simply because it is important to ensure that these tricky concepts are communicated as clearly as possible. However, it is not expected that the instructor will recite these verbatim, feel free to use your own refined and well-honed approach as long as the learning point is covered. The provided narrative is always available if needed. * **Learning and delivery** can be more effective if resources and tasks are personalised. If time permits, feel free to update slides with your own examples such as replacing cat examples with your own pets, or anything else. |
| **Materials** | * [TIFC1-PF-7 - User Input and While Loops - Slides](https://docs.google.com/presentation/d/1fOjuig541h_WkqcRz3NAUHSm4AnrsSfJseM91-YR0R0/edit?usp=sharing) * [TIFC1-PF-7 - User Input and While Loops - Tasks](https://docs.google.com/document/d/1xw8NBH5evU7l687KikdFUS5FQzvGDMI8s_hc1QFViTI/edit?usp=sharing) * Instructor Only: User Input and While Loops Task Solutions |

| **Time** | **Activity** |
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| 5 minutes | **Slide 2: Learning Objectives**   * Read slide objectives to learners. |
| 10 minutes | **Slide 3-4: Recap and Recall the int() function**   * Ask learners to explain when one would need to use the int() function. Refer to example code on slide to show a use case. Demo to learners sample code in editor, show them errors that can occur from not using int(). * Optional, also ask learners the purpose of str() and when this function would be appropriate in code. |
| 10 minutes | **Slide 5: Sample Code**   * **Show Slide 5: Ask** the learners what they think will happen if they run the code. **Encourage** learners to answer the best they can, even if they are unsure. If a learner explain the concepts well, praise them. * **Explain** that the concepts in the example code will be explained in the next slides. Do not run the code yet, this will be done later. |
| 5 minutes | **Slide 6: input() function**   * **Read** out the slide to learners. * **Show** sample code to learners and explain how the use of input() can allow code to become more usable by a user. **Explain** the use cases of input() and how it can be helpful. * **Emphasize** that the answers need to be very clear since python will print whatever you typed into the terminal. |
| 10 minutes | **Slide 7: While loops**   * **Explain** the purpose of a while loop. Say, * *“A while loop is a control flow statement that will repeatedly run a block of code as long as a specified condition is true.”* * **Run the code** from the slide in an editor to show an example of how a while loop works. Say, * *“This piece of code prints numbers from 1 to 5. It starts with the number 1 being stored in a variable called ‘current\_number’, prints it, then will increase the ‘current\_number’ by 1 until the ‘current\_number’ reaches 6; in which case it will stop the loop.”* * **Analyze the code** with the learners and break down what each line of code is doing, answering questions that might arise during the explanation. |
| 5 minutes | **Slide 8: Combining input() and While loops to allow the user to choose when to quit**   * **Show slide 8** and read the slide. * **Go through the sample code** on the slide and explain what it does. Emphasize the following: * **Introduce +=** on line 2 and explain its purpose and benefit in the code. * **Mention the != operator** in the code and some use cases for this. * **Run the code** in an editor to show the functionality of it to the learners. |
| 10 minutes | **Slide 9-11: Flags**   * **Show slide 9** and read from the slide. Once done, move onto slide 10. * **Slide 10: Mention the purpose of a break statement and why it is important.** Say, * *“ A break statement is a type of flag used to immediately exit a loop regardless of whether a loop’s condition has been satisfied. It is important to have in a while loop especially, since without it we would be stuck in something called an infinity loop. This will be demoed later.”* * **Run the code** from the slide to show the functionality of the while loop. Go through each option to demonstrate how the while loop will return to line 2 until anything but the menu items is entered. * **Show slide 11 and explain the purpose of a continue statement.** Say. * *“A continue statement is used to skip remaining code within a loop iteration and move to the next iteration of the loop. A continue statement is good if you want to exclude specific elements from being processed within a loop without terminating the entire loop. This helps with enhancing the code’s efficiency and clarity.”* * **Walk through the code from slide 11**, reading out each line and what the purpose is. When done, **run the code** to show the code’s function. |
| 5 minutes | **Slide 12-13: Infinity loops**   * **Show slide 12 and read from the slide.** * **Show slide 13 and walk through the code with the learners line by line,** explain the expected behavior if this were to run. * **Once completed, run the code in an editor** to show the infinity loop. Explain to learners that to exit the infinity loop and return to the terminal, press Ctrl + C. * **Ask** learners what can be added to the code to prevent an infinity loop from happening. **Paste** a copy of the code into the chatbox and ask learners to add a section to help exit the loop. Once some answers have been put into the chatbox, the instructor will pick one to demonstrate in an editor. |
| 15 minutes | **Slide 14: Try It Out**   * **Show slide 14: Say,** * *“Now that we have learned about while loops and their purpose, can someone explain what would happen if I were to run this code?”* * Have discussion with learners about what would happen if the code were to run, answering any questions that may arise. * **Try It Out - The learners will have a few activities to complete before moving on to the next slides:** * Ask learners to take the code on the screen and modify it to make it their own. * Once completed, have learners add their modified code to the main chat channel so that everyone can see each other's work. * Then, have learners look through their colleague’s code and identify any differences between them. Ask them to comment on at least two pieces of code with what they liked about it or any improvements that can be done. |
| 45 minutes | **Slide 15: Hands-On Challenges**   * **Share link** to task sheet, instruct learners that they now have 45 minutes to work through the task sheet. Once the time is up they should take a screenshot/snip of their last completed challenge and submit it on Canvas. * **Open breakout rooms** - instructor to select number/mix |