

CMPT 120

Lecture 3 – Chatbots –
Variables, Strings, Lists and Modules

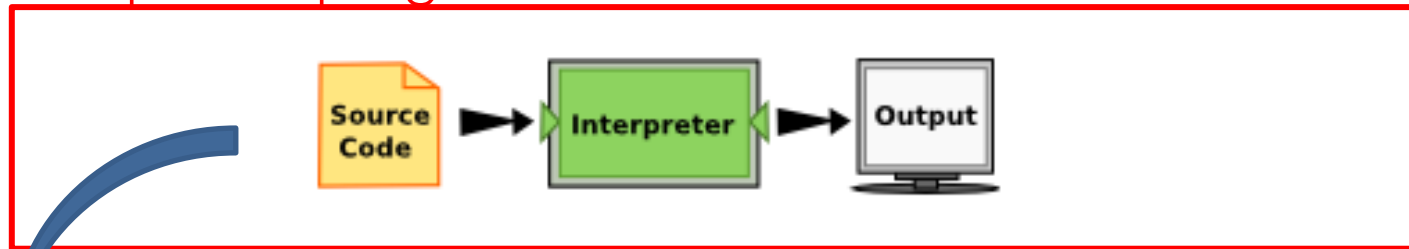
Last Lecture

Programming languages
are examples of
formal languages

- ✓ Problem Solving
- ✓ Software development process
 - ✓ Natural and Formal languages -> see our Readings
 - ✓ Algorithm and programming language
 - ✓ Our first program
 - ✓ Comments + header comment block
 - ✓ Python
 - ✓ `print()` and `input()` function
 - ✓ strings
 - ✓ variables
 - ✓ assignment operator =
 - Execution flow
 - Interpreted program versus compiled program

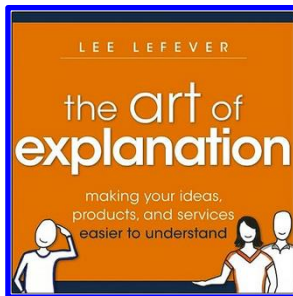
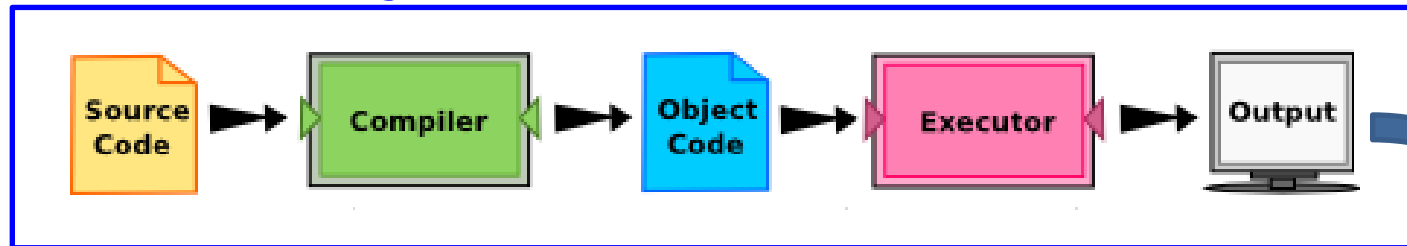
Interpreted program versus compiled program

Interpreted program



Interpreted program versus compiled program

Compiled program



Source: <https://www.commoncraft.com/blog-categories/translations>

From last lecture:

Review Questions

From our Readings

1. What is the single most important skill for a computing scientist?
2. Comments and _____ can make your programs much easier for humans to parse. Use them liberally!
3. What do **natural languages** and **formal languages** have in common?
4. How can I express an algorithm?
5. How would I display **$4 + 7 = 12$** on the screen?

From last lecture:

Review Questions

6. What are the steps we perform when we solve a problem using software?
7. What do we put in a header comment block and why?
8. What would `print("Above\nBelow")` produce on the screen?
9. Give an example of an algorithm?
10. Why do we need algorithms?

Today's Menu

- Introducing Natural language processing and Chatbots
- Can we build chatbots using
 - `print(...)` and `input(...)`
 - data type `str`
 - variables
 - etc...
- Let's see ☺

Natural language processing

- Over the next few lectures, we'll learn about one of the areas in Computing Science called **natural language processing**, and its applications such as **chatbots**.
- And as we do so, we shall continue learning the basic building blocks and syntax of Python programming language while developing **chatbots**.

What is a chatbot?

- “A **chatbot** is a computer program which conducts a conversation by **processing** text expressed in **natural language**.” Thank you Wiki!

Examples of chatbots

- Help chat from Telus, ...

The screenshot displays the Telus website's 'Deals and bundles' page for a 55" Samsung 4K TV. The main offer is 'Get a 55" Samsung 4K TV, on us, with Optik TV and PureFibre Internet¹' for a total value of \$749.99. The bundle includes: 55" Samsung 4K TV¹ (\$0), PureFibre Internet 250 (\$105/mo.), and Optik TV Core + 1 Premium (\$48/mo.). A note mentions 'No \$60 activation charge and \$100 off your first bill²'. A chatbot window is overlaid on the right side of the page. It has a purple header with a smiley face icon and window controls. The text inside says: 'Welcome', 'A quick and easy way to find information and manage your account, 24/7. If our virtual assistant can't help, it will connect you to a live agent.', 'Are you currently a TELUS customer?', 'Yes' (button), 'No' (button), and 'This Chat session will be recorded in accordance with the [TELUS Privacy Commitment](#).' A purple arrow points from a chat icon at the bottom right of the website to the chatbot window.

- **Eliza**: “one of the earliest **chatterbots** (later clipped to **chatbot**) - developed between 1964 to 1967 at MIT by Joseph Weizenbaum” – Thank you Wiki!
 - [Let's have a look!](#)

Here is an encounter with Slackbot

Hi, Slackbot here!



You can ask me simple questions about how Slack works, or just type a few keywords. For example: **Can I edit a message I've posted?** Or simply: **edit message**.

I'm only a bot, but I'll do my best to answer! If I don't understand, I'll search the [Help Center](#).

Today



Slackbot 4:01 PM

Hello, I'm Slackbot. I try to be helpful. (But I'm still just a bot. Sorry!) **Type something** and hit Enter to send your message.



Alavergn 4:01 PM

Something!



Slackbot 4:01 PM

Pleasure to meet you. Let me show you a couple things about Slack.



Alavergn 4:01 PM

OK!



Slackbot 4:01 PM

I'm sorry, I don't understand! Sometimes I have an easier time with a few simple keywords.

Or you can head to our wonderful [Help Center](#) for more assistance!

If you're not sure how to do something in Slack, **just type your question below**.

Or, choose a button to try one of the following quick steps:

Add a Profile Photo

Join Channels

Format Messages

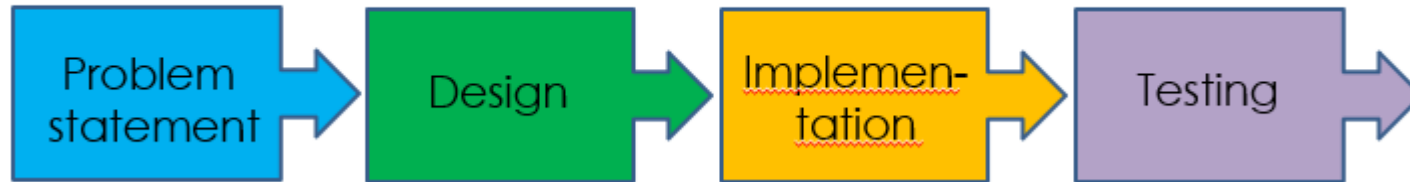


Message Slackbot

Let's create some chatbots! 😊

Review from last lecture

Steps of Software Development Process:



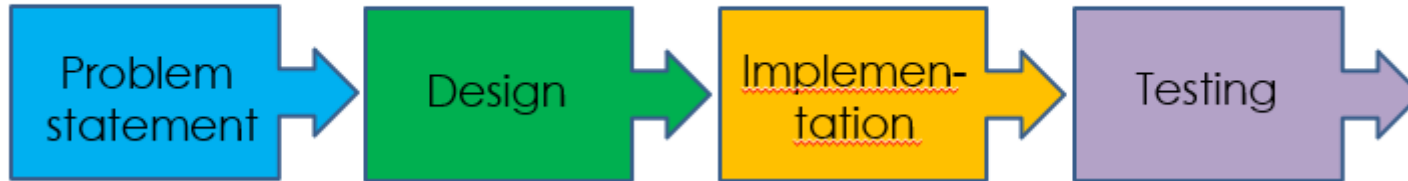
Header
comment
block

```
1 # greetingsWithName.py
2 #
3 # Description: Greeting chatbot that greets the user with name.
4 #
5 # Author: Anne Lavergne
6 # Date: W Jan. 10 2024
7
8 # Ask the user for her/his name
9 # Read the name|
10 # Print a greeting with the user name
```

Algorithm steps

Review from last lecture

Steps of Software Development Process:



```
1|# greetingsWithName.py
2|#
3|# Description: Greeting chatbot that greets the user with name.
4|#
5|# Author: Anne Lavergne
   Jan. 10 2024
```

Assigning a value to a **variable**

Assignment operator =

String

Input

```
10 # Ask the user for her/his name and read the name
   userName = input("What is your name: ")
```

Output





```
12 # Print a greeting with the user name
13 print(f"Greetings, {userName}!")
```

String formatting

When using *string formatting*, i.e., "f" in front of a string, the expression inside { } is first evaluated then its result is concatenated with the rest of the string and the resulting string is printed.

About variables

There are some constraints to how you can name your variables, e.g.

-  Can contain letters, numbers, and underscores
-  Should start with a letter (lowercase, by convention)
-  They can't contain spaces or symbols
-  They can't be one of the reserved keywords (*reserved keywords* -> words Python uses like *print, input, ...*)

Let's improve our chatbot!


- **Step 1 - Problem Statement**

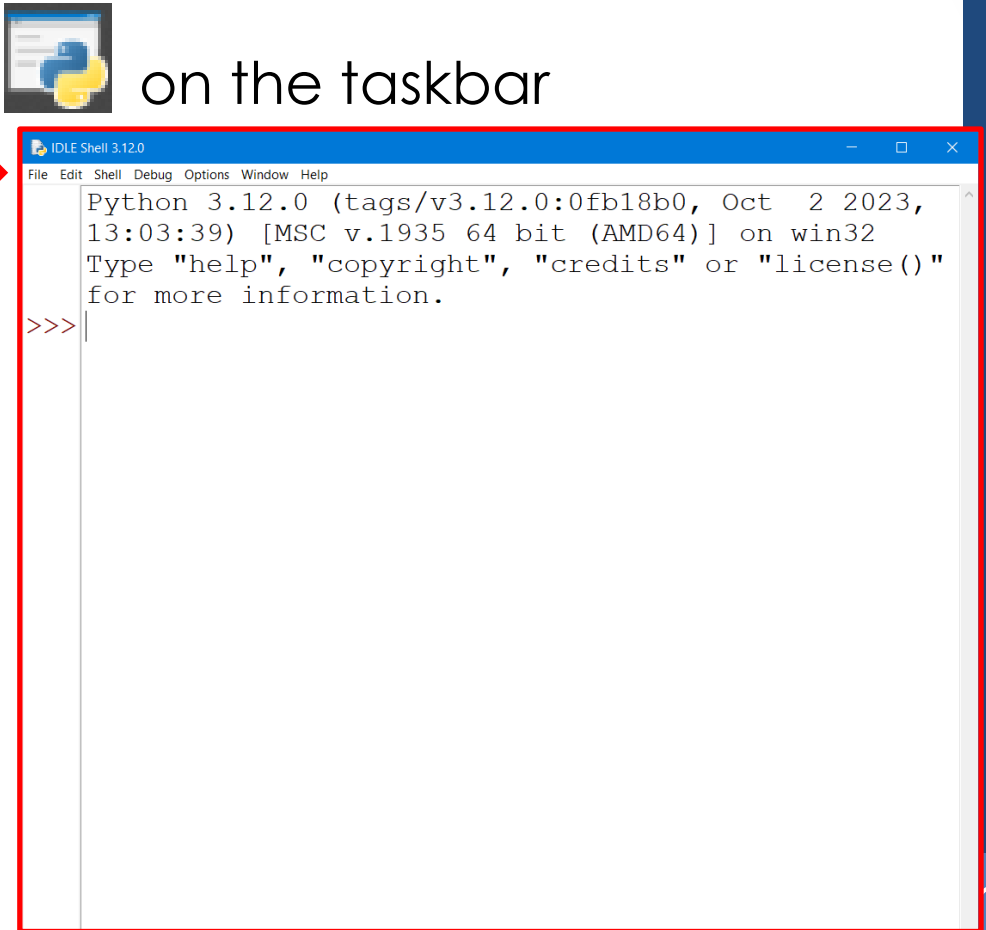
- Create a greeting chatbot that greets the user.

Requirements:

- It must include the user's name as part of the greeting
- We must use Python 3.12 IDLE
and ...
- After the greetings, make the chatbot ask what the user's favourite band is
- After reading the name of the band, the chatbot makes a comment about the band

Starting with Python IDLE

- First click on the icon  on the taskbar
- This opens the Shell →
- Then click on the **File** menu of the Shell window and select **New File** (or **Open ...**)
- This opens the editor in which we can start typing/modifying our program!



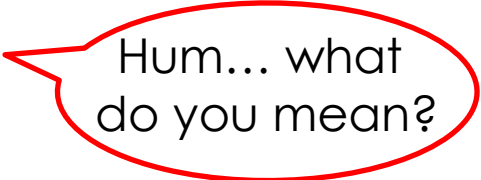
Let's improve our chatbot some more!

- **Step 1 - Problem Statement**

- Create a greeting chatbot that greets the user.

Requirements:

- It must include the user's name as part of the greeting
- We must use Python 3.12 IDLE and ...
- After the greetings, make the chatbot ask what the user's favourite band is
- After reading the name of the band, the chatbot makes a comment about the band
- This comment **should not be too obviously repetitive**



Hum... what do you mean?

Let's introduce Python Lists and Modules

- What is a **list** in Python
- How to create a **list**
- What is a **Module** in Python
- Module must be imported before they are used
- **Import** at the top of the program
(below the header comment block)
- Module **random** and one of its function **choice** (...)

Don't forget to ...

- If we modify our program, let's not forget to ...
 - Update your **algorithm** -> comments
 - Translate them into **Python**
 - **Test** your program

Your turn!

- **Step 1 - Problem Statement**
 - Write a chatbot that prints random fortune cookie quotes.

Review Questions

1. How do you print in Python?
2. What is the command or function to get input from the user?
3. How do you concatenate two words in Python?
4. How do you store an input from the user?
5. What symbol do we use to assign a value to a variable?
6. What is an example of a chatbot?

Review Questions

7. How do we make a list in Python?
8. What module do we need to import to randomly choose something from a list?
9. How can we test smaller pieces of our Python code?
10. What does a dot after a module name do?
11. What is the only kind of symbol we can have in a variable name?

Summary

- Introduced **Natural language processing** and **Chatbots**
- We built **chatbots** using
 - `print(...)` and `input(...)`
 - data type `str`
 - variables
 - string formatting
 - list
 - `random` module

Next Lecture

- We shall introduce **branching**
 - A way of controlling the **execution flow** when the program is executed