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2270 Week 10
Project Turn In

My final project ended up teaching me a great lesson in project scope. While I felt confident in my ability to code the encoding and decoding of a Morse Code signal, I found it to be much more of a struggle. I ended up scratching my original plan due to the fact I just couldn't get the code to function as I had outlined. I ended up go into a straight map-key table solution which fit my problem set much better. Given a string of text, the program will encode to Morse Code output string. Vice Versa, given a string of morse dits and dahs, the program will decode the message and put it into plain characters. I hit one obstical that I could not overcome. I could turn the text into Morse easily; however, I could not figure out spaces properly when coming back the other way. I purposly wanted to process mulitples spaces in a row in a string uniquely depeding on how many spaces I needed. For example, one space would consitutue a new character while 2 spaces equated to a new word. The results I got were either spread out with many extra spaces, had no spaces, or threw an error stating that string could not be nonetypes. That single bit was researched for about 4 hours and I was not able to overcome that obsitcle. That is why my final attempt has removed the spaces altogether.

The second part of what I thought would be a simple task was attempting to get the information directly from a radio wave. While I thought is would be as simple as recording the on/off time I quickly started to discover that I did not have the proper digital signal processing skills that are required to convert raw waves into digital data that can then be turned into dits and dahs.

I was able to begin working with a SDR that plugs into my USB drive and picks up local FM radio stations. I was able to sample data through GNU radio's block code flow graph, however the data appeared to be so random that pulling out information seemed near impossible.

My project shows my dictionary approach which is something that I was happy to learn about in this course. I am continuing my learning on processing signals and need to enroll in a course that helps me "clean" my sample data. I began researching normalizing functions using SciPy with the best luck using a Savitzy-Golay Filter...however as I said at the beginning of this write up, I learned a lesson about taking on more than my present coding abilities have to offer.

```
def toMorse(s):
        toMorse = {
        "A": ".-",
    "B": "-...",
    "C": "-.-.",
    "D": "-..",
    "E": ".",
    "F": "..-.",
    "G": "--.",
```

```
    "H": "....",
    "I": "..",
    "J": ".---",
    "K": "-.-",
    "L": ".-..",
    "M": "--",
    "N": "-.",
    "O": "---",
    "P": ".--.",
    "Q": "--.-",
    "R": ".-.",
    "S": "...",
    "T": "-",
    "U": "..-",
    "V": "...-",
    "W": ".--",
    "X": "-..-",
    "Y": "-.--",
    "Z": "--..",
    "0": "-----",
    "1": ".----",
    "2": "..---",
    "3": "...--",
    "4": "....-",
    "5": ".....",
    "6": "-....",
    "7": "--...",
    "8": "---..",
    "9": "----.",
    " ": " "
        }

        i=0
        ret = ""
        while i < len(s):
                ret += (toMorse.get(s[i])) + " "
                i+=1
        print(ret)
        return ret

def fromMorse(s):
        fromMorse = {
        ".-": "A",
```

```
"-...": "B",
"-.-.": "C",
"-..": "D",
".": "E",
"..-.": "F",
"--.": "G",
"....": "H",
"..": "I",
".---": "J",
"-.-": "K",
".-..": "L",
"--": "M",
"-.": "N",
"---": "O",
".--.": "P",
"--.-": "Q",
".-.": "R",
"...": "S",
"-": "T",
"..-": "U",
"...-": "V",
".--": "W",
"-..-": "X",
"-.--": "Y",
"--..": "Z",
"-----": "0",
".----": "1",
"..---": "2",
"...--": "3",
"....-": "4",
".....": "5",
"-....": "6",
"--...": "7",
"---..": "8",
"----.": "9",
" ": " "
    }

    i=0
    temp = ""
    phrase = ""
    while i < len(s):
        if s[i] != "-" or s[i] != ".":
```

```
                phrase += ""
            if s[i] == "-" or s[i] == ".":
                temp += s[i]
            else:
                phrase += fromMorse.get(temp)
                temp = ""
            i += 1
        phrase += fromMorse.get(temp)
        print(phrase)
```

```
toMorse("THIS IS MY FIRST ATTEMPT AT MORSE CODE I AM ENCRYPTING THIS
MESSAGE USING A DICTIONARY AND MAP SYSTEM THAT IS A POWERFUL NEW TOOL
THAT I LEARNED IN CSCI")
print('')
fromMorse("- .... .. ... .. ... -- -.-- ..-. .. .-. ... - .- - - . -- .--. - .- - -- --- .-. ... . -.-. --- -.. . .. .- -- . -. -.-. .-.
-.-- .--. - .. -. --. - .... .. ... -- . ... ... .- --. . ..- ... .. -. --. .- -.. .. -.-. - .. --- -. .- .-. -.-- .- -. -.. -- .- .--. ... -.--
... - . -- - .... .- - .. ... .- .--. --- .-- . .-. ..-. ..- .-.. -. . .-- - --- --- .-.. - .... .- - .. .-.. . .- .-. -. . -.. .. -. -.-. ...
-.-. .." )
```