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For the RSA project my partner and I created a program that could encrypt messages into ciphers and decrypt other ciphers by using a public and private key. The keys used for these messages are considered the variables  $d$ ,  $e$ , and  $n$ ; the program that was created asks the user to assign their numerical key to either variable  $d$  or  $e$  depending on their choice of decrypting or encrypting. To develop this program we decided to split certain sections of the program into individual sections; I focused on the decryption function and the menu system that made sure the program would loop until the user cancels, my partner primarily worked on generating our private key ( $d$  value) and created our encryption function.

The first difficulty that occurred was creating the decryption function. When we attempted to decrypt our message we would get no response from the program. Upon examination it was realized that by setting `encrypted_message` to be added to `numerize` the message wouldn't finish the encryption process, what was also more apparent was that `numerize` was defined as a string and not an integer. In order to resolve this we changed `numerize` to `denumerize` as well as set the dictionary function for encryption to equal `denumerize`, this was correct since at that point during the encryption process the message was converted into numbers, by adding and equating `encrypted_message` to `denumerize` the numbers would be converted into text.

Second problem was when creating the while loop that made a continuous loop. The first attempt was a simple function that asked the user yes or no after they encrypted or decrypted, if typed no the code would break. This somewhat worked but lacked the option to choose between encrypting and decrypting. To rework the loop I decided to make a function called `program_on`, below it was the entirety of the program. By setting `program_on` to “true” an input that would declare `program_on` “false” would effectively turn off the function, in practice, this worked without error. I added the input called `option` that would ask the user to decrypt or encrypt, once the user chose, the program would ask another question to continue or not.