605.204 Computer Organization
Team Project
Due: 10 August 2025
Team 3 – Brian Astrove, Alfredo Ormeno Zuniga, Kosuke Ito, Portia Stevenson
===

Output 1: Hello from Team 3

Generating Keys:

```
su25e08a3e@rpi-buster-armhf:~/Assembly/project$ ./RSA

Please select an option by entering the corresponding number:

0 — Generate Keys
1 — Encrypt a message
2 — Decrypt a message
3 — Exit the program

Enter your choice (0,1, 2, or 3): 0

To generate keys, please enter a P and Q value.
P and Q must be integers, prime, positive, and smaller than 50.
Please enter a P value: 47

To generate keys, please enter a P and Q value.
P and Q must be integers, prime, positive, and smaller than 50.
Please enter a Q value: 37

Your RSA keys have been generated:
Public Key: (e = 5, n = 1739)
Private Key: (d = 1325, n = 1739)
```

Encrypting a Message:

```
su25e08a3e@rpi-buster-armhf:~/Assembly/project$ ./RSA

Please select an option by entering the corresponding number:

0 — Generate Keys
1 — Encrypt a message
2 — Decrypt a message
3 — Exit the program

Enter your choice (0,1, 2, or 3): 1
Please enter your calculated public key (e) value:
5
Please enter your calculated n value:
1739
Please enter a message for encryption. 500 characters max:
Hello from Team 3
```

Decrypting a Message:

```
su25e08a3e@rpi-buster-armhf:~/Assembly/project$ ./RSA
[
 Please select an option by entering the corresponding number:

 0 - Generate Keys
[1 - Encrypt a message
 2 - Decrypt a message
[3 - Exit the program
[
 Enter your choice (0,1, 2, or 3): 2
 Please enter your calculated private key (d) value:
 1325
 Please enter your calculated n value:
 1739
 Parsed value: 153
 Chars read: 3
 Parsed value: 72
[Parsed value: 122
 Chars read: 4
[Parsed value: 101
 Parsed value: 238
[Chars read: 4
 Parsed value: 108
 Parsed value: 238
 Chars read: 4
 Parsed value: 108
 Parsed value: 222
 Chars read: 4
 Parsed value: 111
 Parsed value: 427
 Chars read: 4
 Parsed value: 32
 Parsed value: 1372
 Chars read: 5
 Parsed value: 102
 Parsed value: 428
 Chars read: 4
 Parsed value: 114
 Parsed value: 222
 Chars read: 4
 Parsed value: 111
 Parsed value: 560
 Chars read: 4
 Parsed value: 109
 Parsed value: 427
 Chars read: 4
 Parsed value: 32
 Parsed value: 63
 Chars read: 3
 Parsed value: 84
 Parsed value: 122
 Chars read: 4
 Parsed value: 101
 Parsed value: 8
 Chars read: 2
 Parsed value: 97
 Parsed value: 560
 Chars read: 4
 Parsed value: 109
 Parsed value: 427
 Chars read: 4
 Parsed value: 32
 Parsed value: 695
 Chars read: 4
 Parsed value: 51
 Parsed value: 695
 Chars read: 0
```
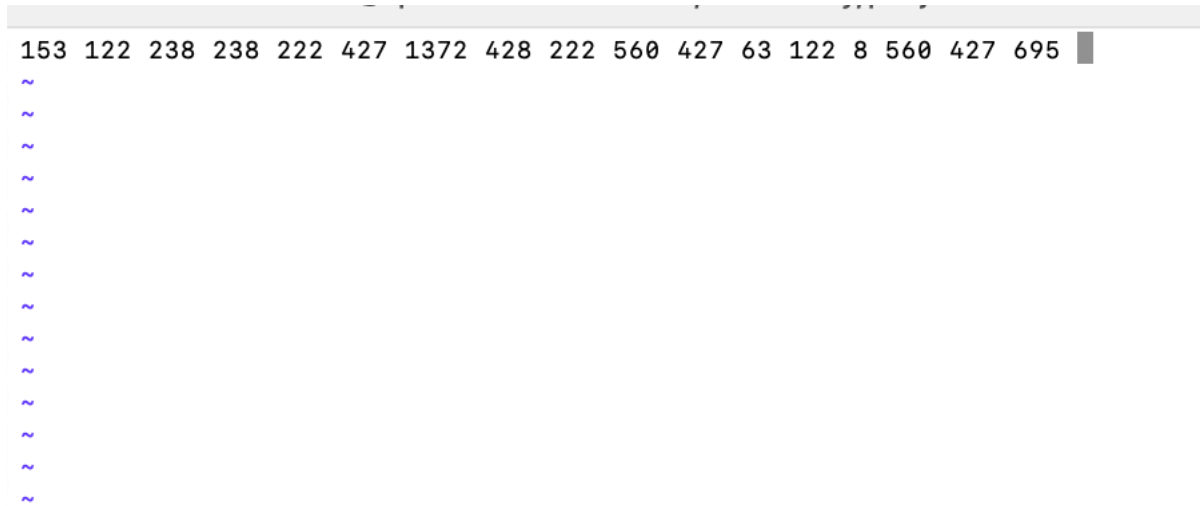
Encrypted.txt

```
153 122 238 238 222 427 1372 428 222 560 427 63 122 8 560 427 695
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
```

Plaintext.txt

```
Hello from Team 3
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
```

==

Output 2: this message

```
su25534fe9@rpi-buster-armhf:~/RSA-Algorithm/RSA-Algorithm/app$ ./main

Please select an option by entering the corresponding number:

0 - Generate Keys
1 - Encrypt a message
2 - Decrypt a message
3 - Exit the program

Enter your choice (0,1, 2, or 3): 0

To generate keys, please enter a P and Q value.
P and Q must be integers, prime, positive, and smaller than 50.
Please enter a P value: 11

To generate keys, please enter a P and Q value.
P and Q must be integers, prime, positive, and smaller than 50.
Please enter a Q value: 13

Your RSA keys have been generated:
Public Key: (e = 7, n = 143)
Private Key: (d = 103, n = 143)
su25534fe9@rpi-buster-armhf:~/RSA-Algorithm/RSA-Algorithm/app$ ./main

Please select an option by entering the corresponding number:

0 - Generate Keys
1 - Encrypt a message
2 - Decrypt a message
3 - Exit the program

Enter your choice (0,1, 2, or 3): 1
Please enter your calculated public key (e) value:
7
Please enter your calculated n value:
143
Please enter a message for encryption. 500 characters max:
this message
su25534fe9@rpi-buster-armhf:~/RSA-Algorithm/RSA-Algorithm/app$ ./main

Please select an option by entering the corresponding number:

0 - Generate Keys
1 - Encrypt a message
2 - Decrypt a message
3 - Exit the program

Enter your choice (0,1, 2, or 3): 2
Please enter your calculated private key (d) value:
103
Please enter your calculated n value:
143
Parsed value: 129
Chars read: 3
Parsed value: 116
Parsed value: 91
Chars read: 3
Parsed value: 104
Parsed value: 118
Chars read: 4
Parsed value: 105
Parsed value: 80
Chars read: 3
Parsed value: 115
Parsed value: 98
Chars read: 3
Parsed value: 32
Parsed value: 21
Chars read: 3
Parsed value: 109
Parsed value: 62
Chars read: 3
Parsed value: 101
Parsed value: 80
Chars read: 3
Parsed value: 115
Parsed value: 80
Chars read: 3
Parsed value: 115
Parsed value: 59
Chars read: 3
Parsed value: 97
Parsed value: 38
Chars read: 3
Parsed value: 103
Parsed value: 62
Chars read: 3
Parsed value: 101
Parsed value: 62
Chars read: 0
su25534fe9@rpi-buster-armhf:~/RSA-Algorithm/RSA-Algorithm/app$ vi plaintext.txt
```
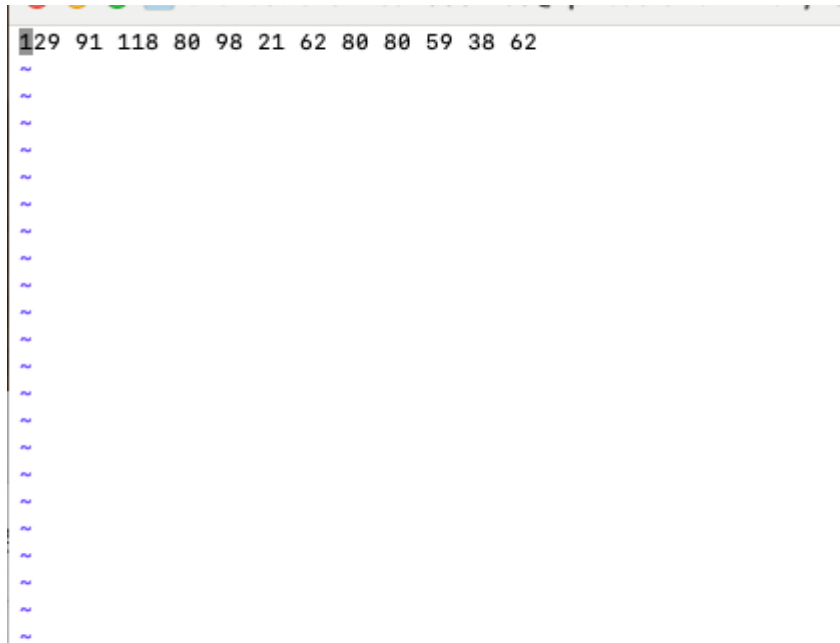
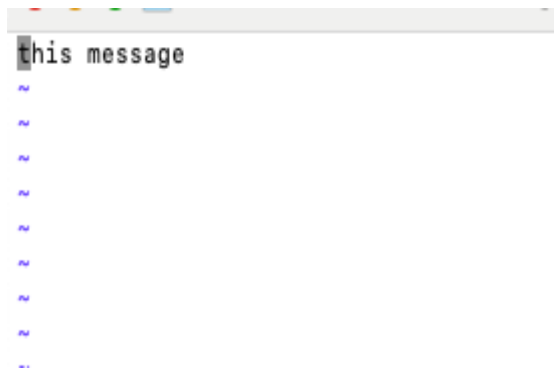==
encrypted.txt

```
129 91 118 80 98 21 62 80 80 59 38 62
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
```

plaintext.txt

```
this message
~
~
~
~
~
~
~
~
~
~
```

===

Output 3: 1234ABCDabcd TEST

```
To generate keys, please enter a P and Q value.
P and Q must be integers, prime, positive, and smaller than 50.
Please enter a P value: 23

To generate keys, please enter a P and Q value.
P and Q must be integers, prime, positive, and smaller than 50.
Please enter a Q value: 43

Your RSA keys have been generated:
Public Key: (e = 5, n = 989)
Private Key: (d = 185, n = 989)
su25534fe9@rpi-buster-armhf:~/RSA-Algorithm/RSA-Algorithm/app$ ./main

Please select an option by entering the corresponding number:

0 — Generate Keys
1 — Encrypt a message
2 — Decrypt a message
3 — Exit the program

Enter your choice (0,1, 2, or 3): 1
Please enter your calculated public key (e) value:
5
Please enter your calculated n value:
989
Please enter a message for encryption. 500 characters max:
1234ABCDabcd TEST
su25534fe9@rpi-buster-armhf:~/RSA-Algorithm/RSA-Algorithm/app$ ./main

Please select an option by entering the corresponding number:

0 — Generate Keys
1 — Encrypt a message
2 — Decrypt a message
3 — Exit the program

Enter your choice (0,1, 2, or 3): 2
Please enter your calculated private key (d) value:
185
Please enter your calculated n value:
989
Parsed value: 36
Chars read: 2
Parsed value: 49
Parsed value: 725
Chars read: 4
Parsed value: 50
Parsed value: 733
Chars read: 4
Parsed value: 51
Parsed value: 784
Chars read: 4
Parsed value: 52
Parsed value: 770
Chars read: 4
Parsed value: 65
Parsed value: 447
Chars read: 4
Parsed value: 66
Parsed value: 658
Chars read: 4
Parsed value: 67
Parsed value: 712
Chars read: 4
Parsed value: 68
Parsed value: 618
Chars read: 4
Parsed value: 97
Parsed value: 163
Chars read: 4
Parsed value: 98
Parsed value: 891
Chars read: 4
Parsed value: 99
Parsed value: 453
Chars read: 4
Parsed value: 100
Parsed value: 629
Chars read: 4
Parsed value: 32
Parsed value: 398
Chars read: 4
Parsed value: 84
Parsed value: 46
Chars read: 3
Parsed value: 69
Parsed value: 15
Chars read: 3
Parsed value: 83
Parsed value: 398
Chars read: 4
Parsed value: 84
Parsed value: 398
Chars read: 0
su25534fe9@rpi-buster-armhf:~/RSA-Algorithm/RSA-Algorithm/app$
```
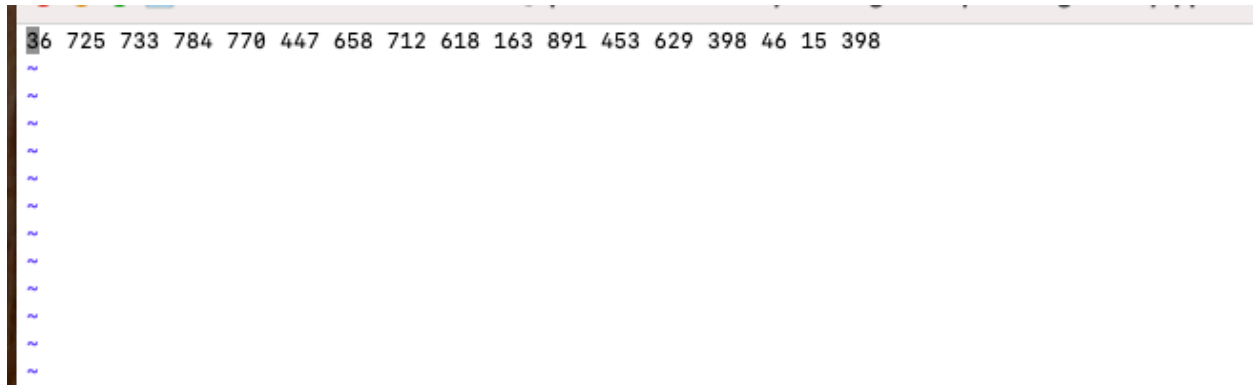
Encrypted.txt:

36 725 733 784 770 447 658 712 618 163 891 453 629 398 46 15 398

Plaintext.txt

1234ABCDabcd TEST

==
Output 4: Error Checking in Key Generation

[**su25e08a3e@rpi-buster-armhf**:**~/Assembly/project**$ ./RSA

 Please select an option by entering the corresponding number:

 0 – Generate Keys
 1 – Encrypt a message
 2 – Decrypt a message
 3 – Exit the program

[Enter your choice (0,1, 2, or 3): 0
 To generate keys, please enter a P and Q value.
 P and Q must be integers, prime, positive, smaller than 50, and their products must be creater than 127.
[Please enter a P value: 6
 To generate keys, please enter a P and Q value.
 P and Q must be integers, prime, positive, smaller than 50, and their products must be creater than 127.
[Please enter a P value: 5
 To generate keys, please enter a P and Q value.
 P and Q must be integers, prime, positive, smaller than 50, and their products must be creater than 127.
[Please enter a Q value: 101
 To generate keys, please enter a P and Q value.
 P and Q must be integers, prime, positive, smaller than 50, and their products must be creater than 127.
[Please enter a Q value: 49
 To generate keys, please enter a P and Q value.
 P and Q must be integers, prime, positive, smaller than 50, and their products must be creater than 127.
[Please enter a Q value: 3

 The product of p and q must be greater than 127!
 To generate keys, please enter a P and Q value.
 P and Q must be integers, prime, positive, smaller than 50, and their products must be creater than 127.
[Please enter a P value: 33
 To generate keys, please enter a P and Q value.
 P and Q must be integers, prime, positive, smaller than 50, and their products must be creater than 127.
[Please enter a P value: 31
 To generate keys, please enter a P and Q value.
 P and Q must be integers, prime, positive, smaller than 50, and their products must be creater than 127.
[Please enter a Q value: 37

 Your RSA keys have been generated:
 Public Key: (e = 7, n = 1147)
 Private Key: (d = 463, n = 1147)

===

Output 5: Message with Symbols

[**su25e08a3e@rpi-buster-armhf**:**~/Assembly/project**$ ./RSA

Please select an option by entering the corresponding number:

0 — Generate Keys
1 — Encrypt a message
2 — Decrypt a message
3 — Exit the program

[Enter your choice (0,1, 2, or 3): 1
Please enter your calculated public key (e) value:
5
Please enter your calculated n value:
[989
Please enter a message for encryption. 500 characters max:
[%test test
[**su25e08a3e@rpi-buster-armhf**:**~/Assembly/project**$ ./RSA

Please select an option by entering the corresponding number:

0 — Generate Keys
1 — Encrypt a message
2 — Decrypt a message
3 — Exit the program

[Enter your choice (0,1, 2, or 3): 2
Please enter your calculated private key (d) value:
[185
Please enter your calculated n value:
[989
Parsed value: 222
Chars read: 3
Parsed value: 37
Parsed value: 829
Chars read: 4
Parsed value: 116
Parsed value: 468
Chars read: 4
Parsed value: 101
Parsed value: 966
Chars read: 4
Parsed value: 115
Parsed value: 829
Chars read: 4
Parsed value: 116
Parsed value: 629
Chars read: 4
Parsed value: 32
Parsed value: 829
Chars read: 4
Parsed value: 116
Parsed value: 468
Chars read: 4
Parsed value: 101
Parsed value: 966
Chars read: 4
Parsed value: 115
Parsed value: 829
Chars read: 4
Parsed value: 116
Parsed value: 829
Chars read: 0

==

encrypted.txt

```
222 829 468 966 829 629 829 468 966 829
~
~
~
```

plaintext.txt

```
%test test
~
~
~
~
~
~
```