Applied Cryptography
Lab -03

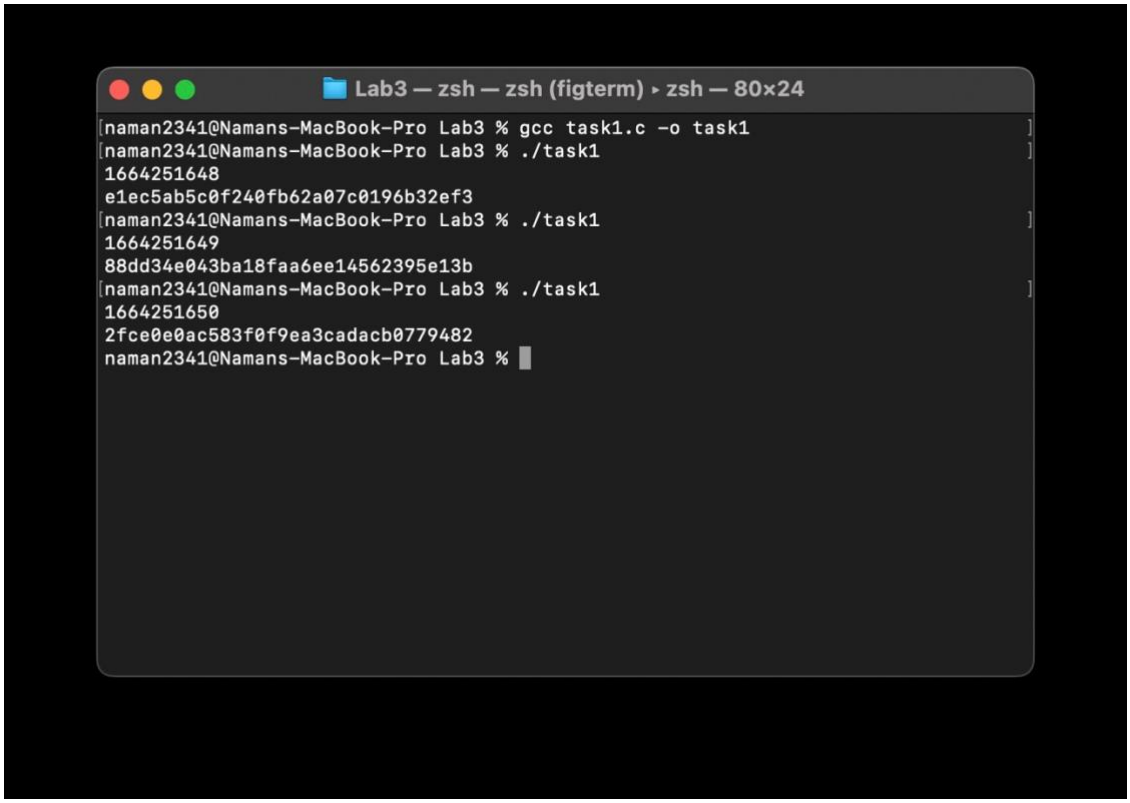
Name	Naman Choudhary
SRN	PES2UG20CS209
Section	D

Task 1: Generate Encryption Key in a Wrong Way

Code:

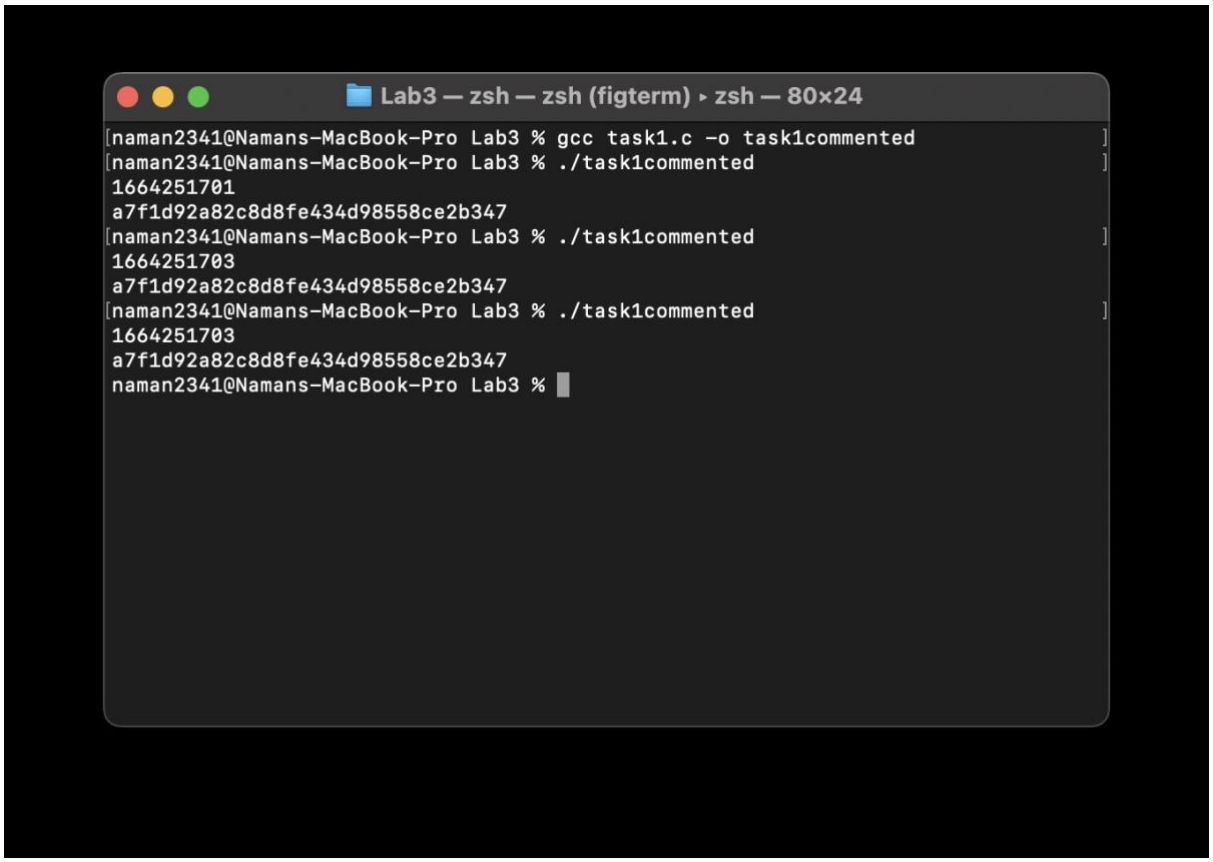
```
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
#define KEYSIZE 16
int main() {
int i;
char key[KEYSIZE];
printf("%lld\n", (long long) time(NULL));
srand (time(NULL));
for (i = 0; i< KEYSIZE; i++) {
key[i] = rand()%256;
printf("%.2x", (unsigned char)key[i]);
}
printf("\n");
return 0;
}
```

Screenshot:



After commenting srand(time(NULL));

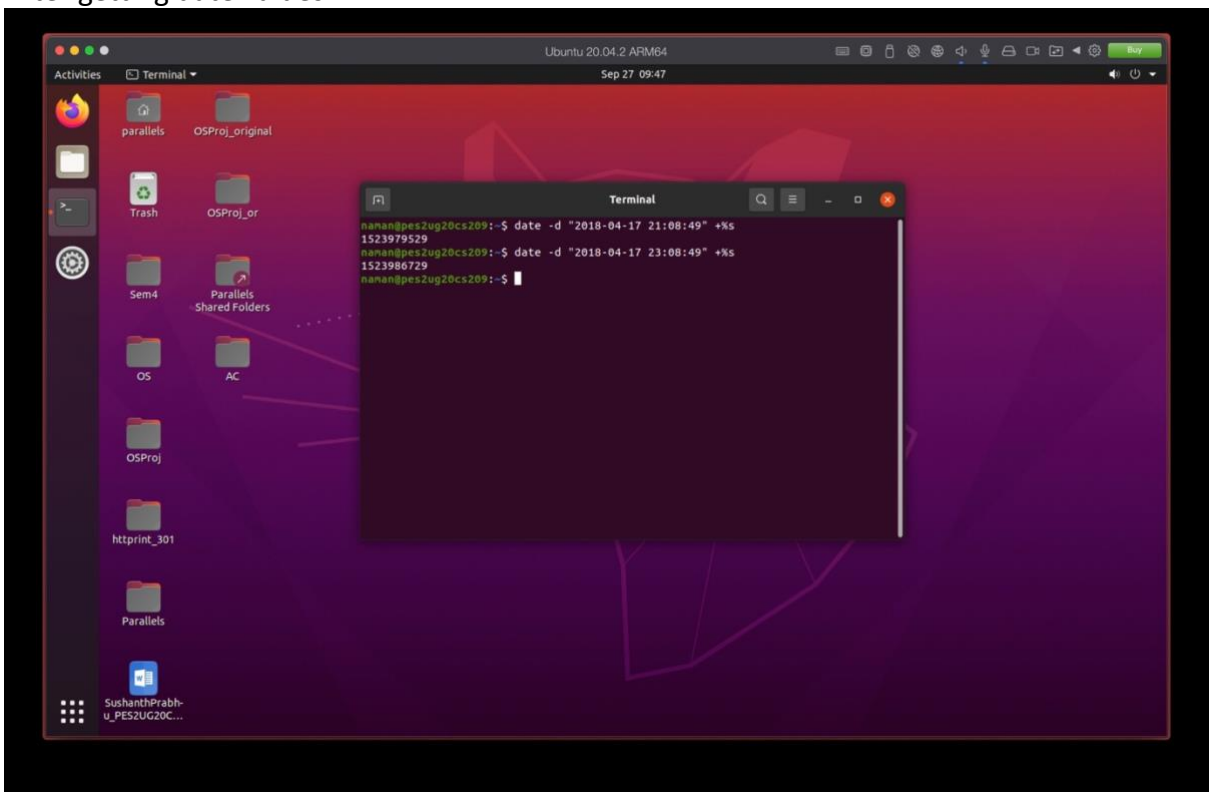
Screenshot:



Observation: In case 1, we got different outputs every time, but in case 2, we get the same output on different runs

Task 2: Guessing the Key

After getting date values:

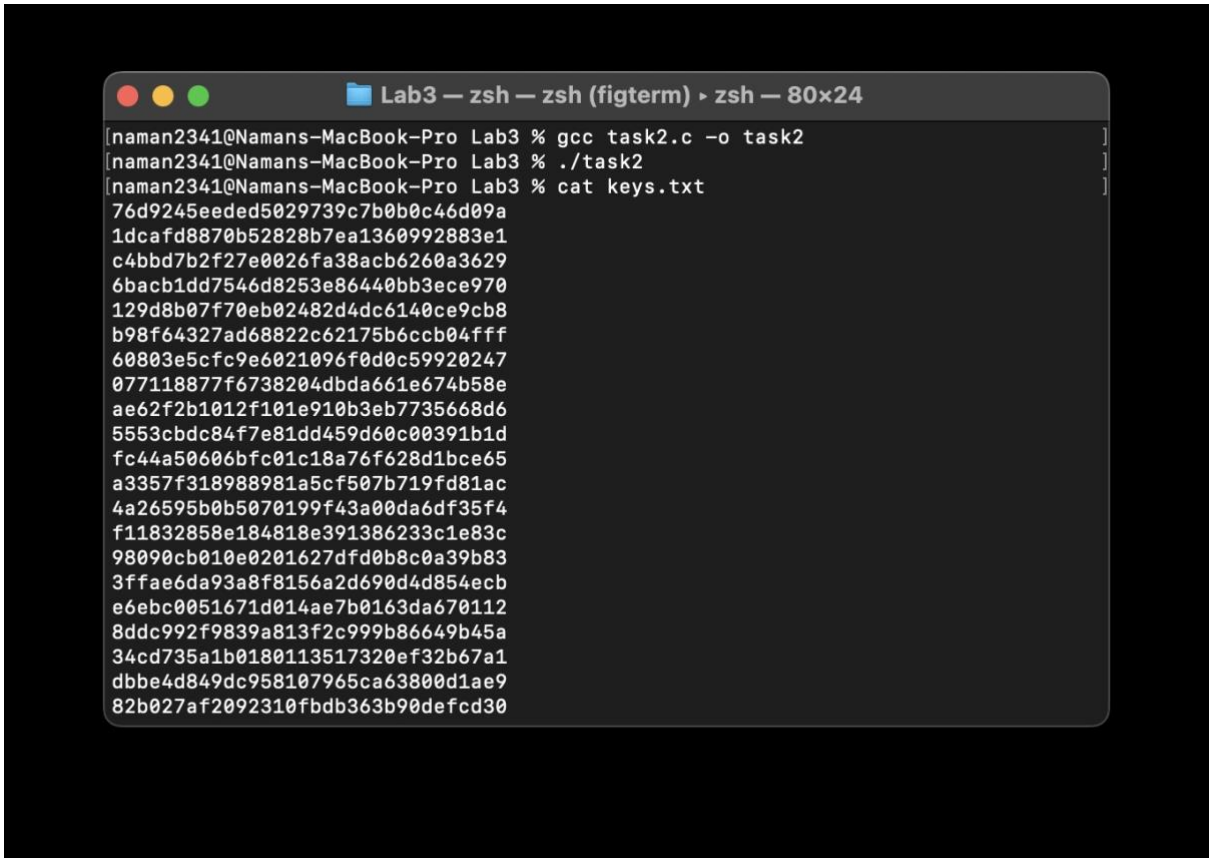


Code:

```c
/* task2.c */
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
#define KEYSIZE 16
int main() {
int i, j;
FILE *f;
char key[KEYSIZE];
int value1, value2;
value1 = 1523979529;
value2 = 1523986729;
f = fopen("./keys.txt", "w");
```

```
for (j = value1; j <= value2; j++) {
srand (j);
for (i = 0; i< KEYSIZE; i++) {
key[i] = rand()%256;
fprintf(f, "%.2x", (unsigned char)key[i]);
}
fprintf(f,"\n");
}
return 0;
}
```

Screenshot:



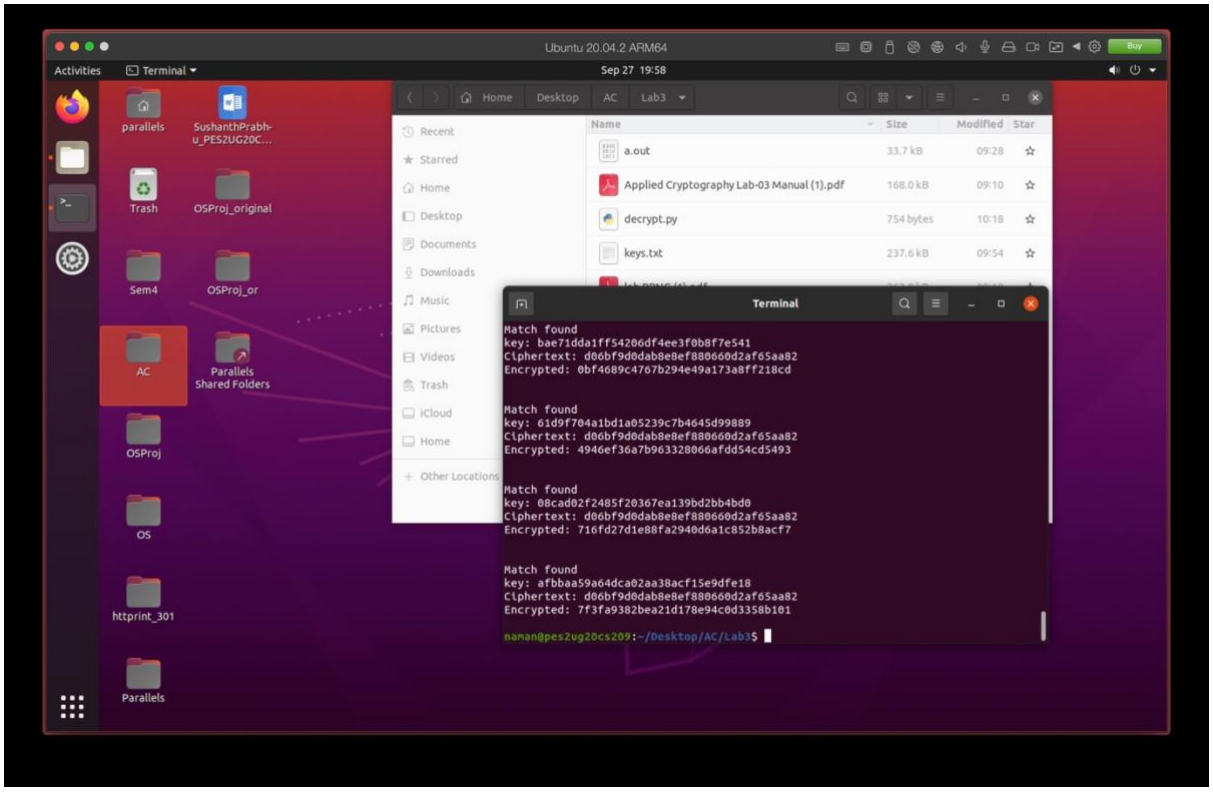
Observation: Keys were generated in keys.txt

Code 2:

```
from Crypto import Random
from Crypto.Cipher import AES
file = open("./keys.txt", "r")
ciphertext = "d06bf9d0dab8e8ef880660d2af65aa82"
```

```
for i in range(0,7200):
    str = file.readline()
    key = bytes.fromhex(str[:-1])#.decode("hex")
    IV = bytes.fromhex("09080706050403020100A2B2C2D2E2F2".lower())
    plaintext1 = bytes.fromhex("255044462d312e350a25d0d4c5d80a34")
    cipher = AES.new(key, AES.MODE_CBC, IV)
    encrypted = cipher.encrypt(plaintext1)
    # print("Encrypted: ",encrypted.hex())
    if ciphertext == encrypted.hex() or (True):#.encode("hex")[0:32]:
        print("")
        print("Match found")
        print("key: "+str[:-1])
        print("Ciphertext: " + ciphertext)
        print("Encrypted: " + (encrypted).hex())
        print("")
```

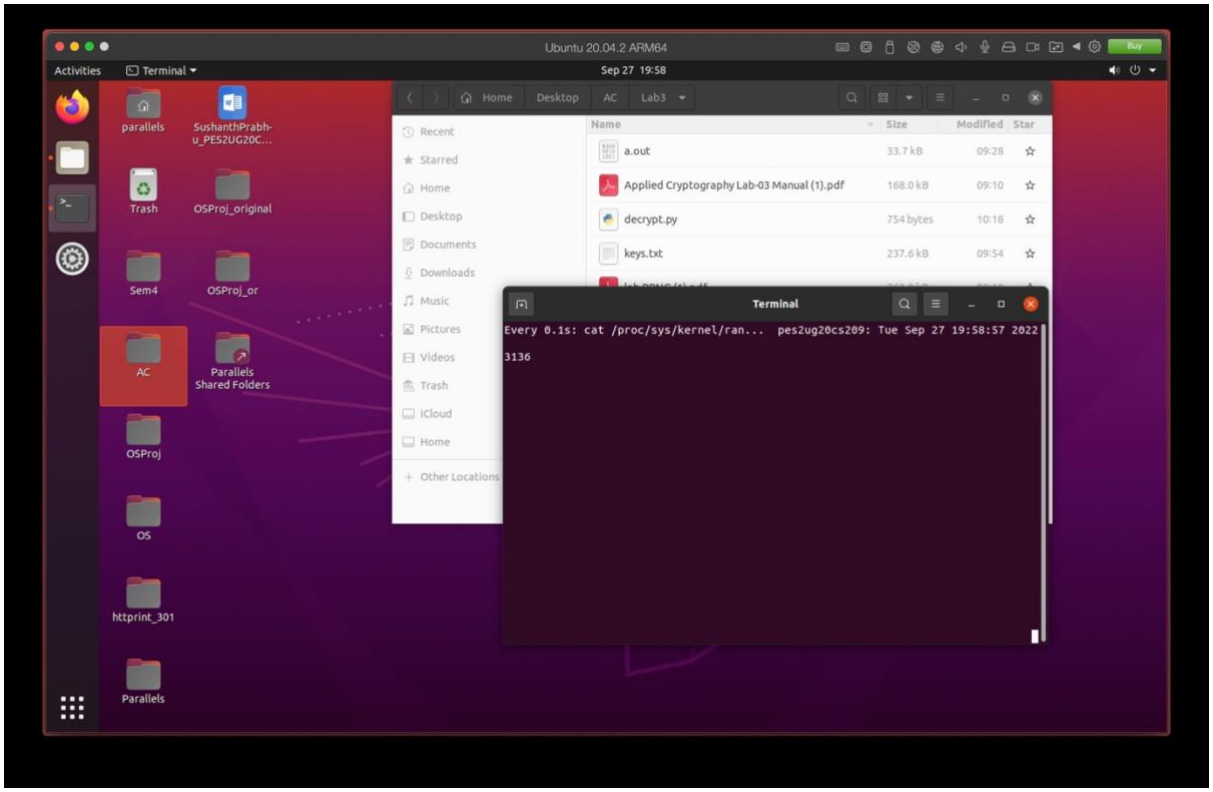
Screenshot:



Observation: The keys were generated correctly

Task 3: Measure the Entropy of Kernel

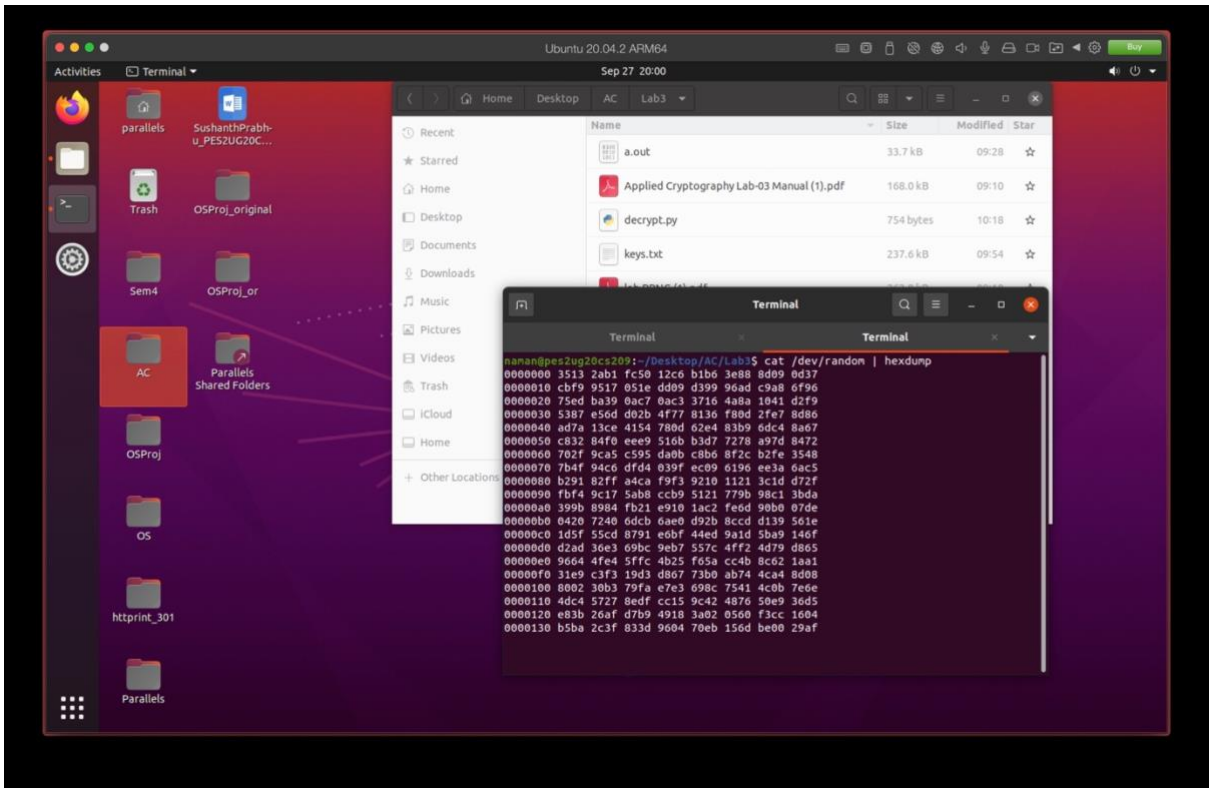
Screenshot:



Observation: The entropy increases with mouse movements and key presses, and comes back to 0 after a particular value

Task 4: Get Pseudo Random Numbers from /dev/random

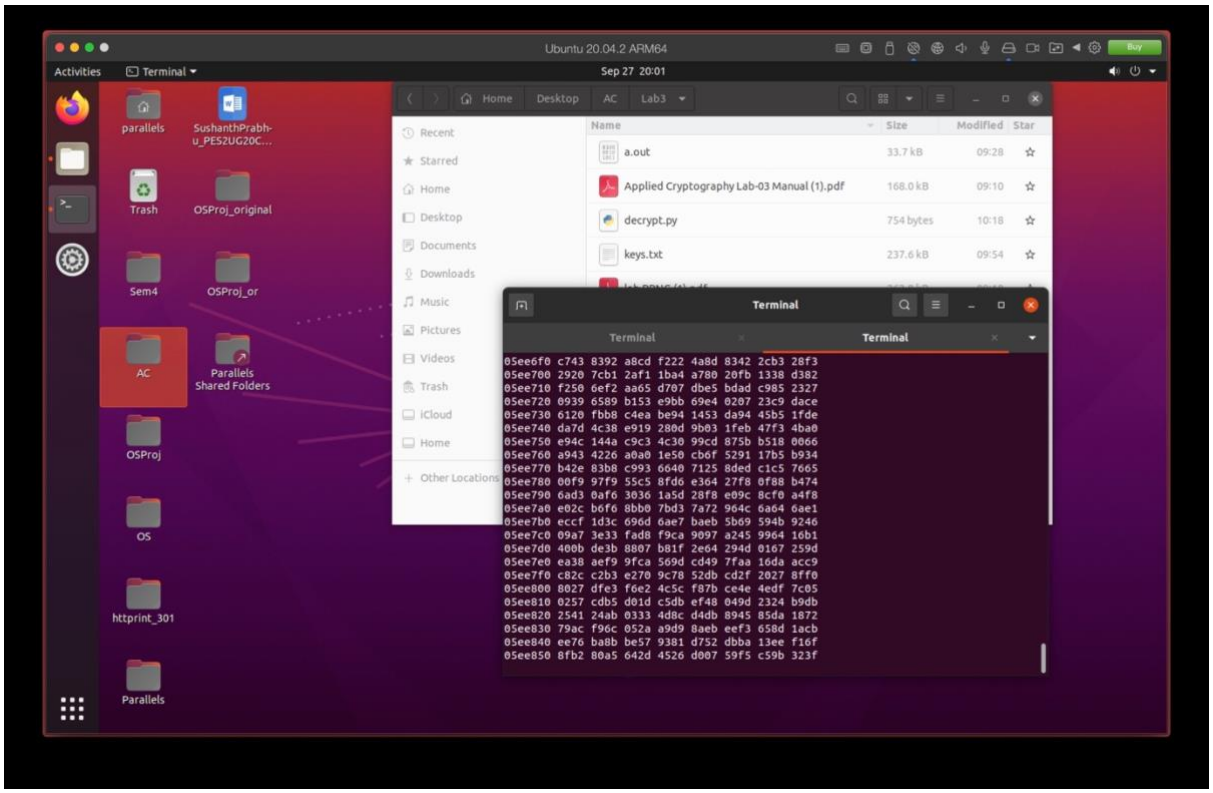
Screenshot:



Observation: hexdump generated hexes of the entropy, which increased after a large amount of mouse movement

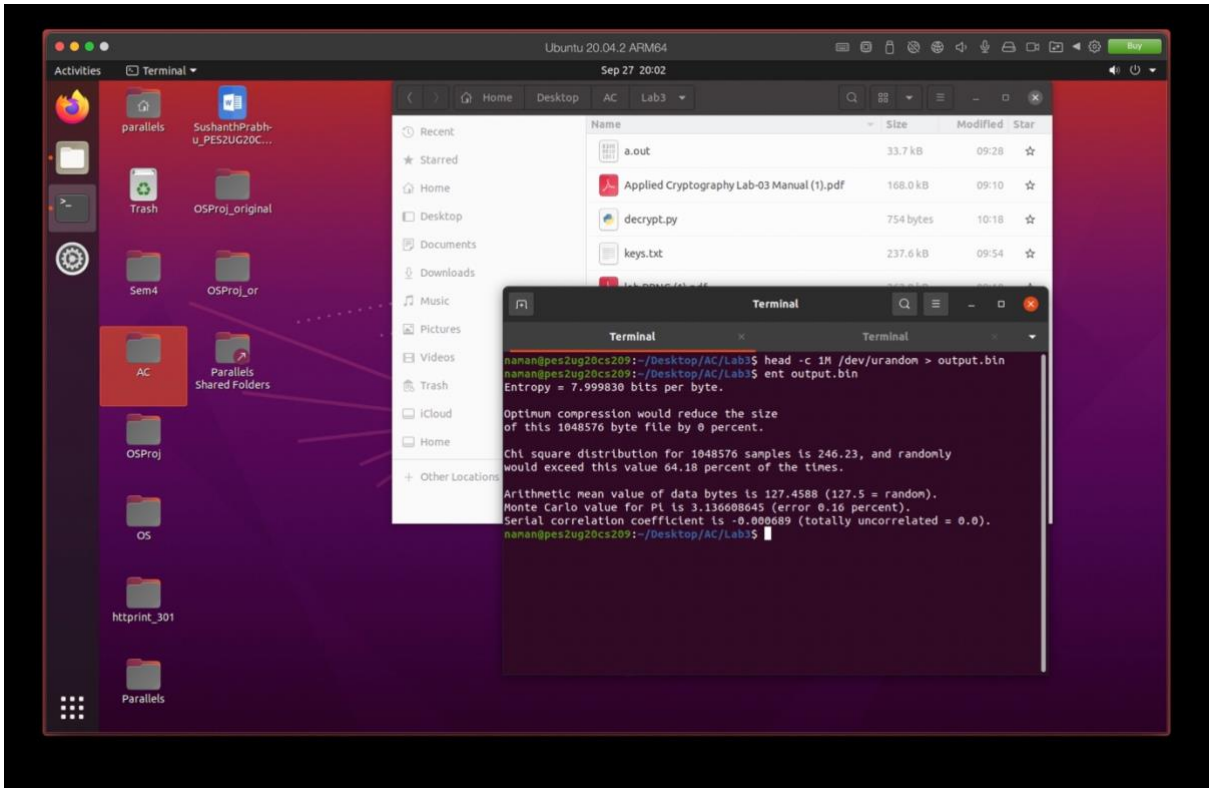
Task 5: Get Pseudo Random Numbers from /dev/urandom

Screenshot:



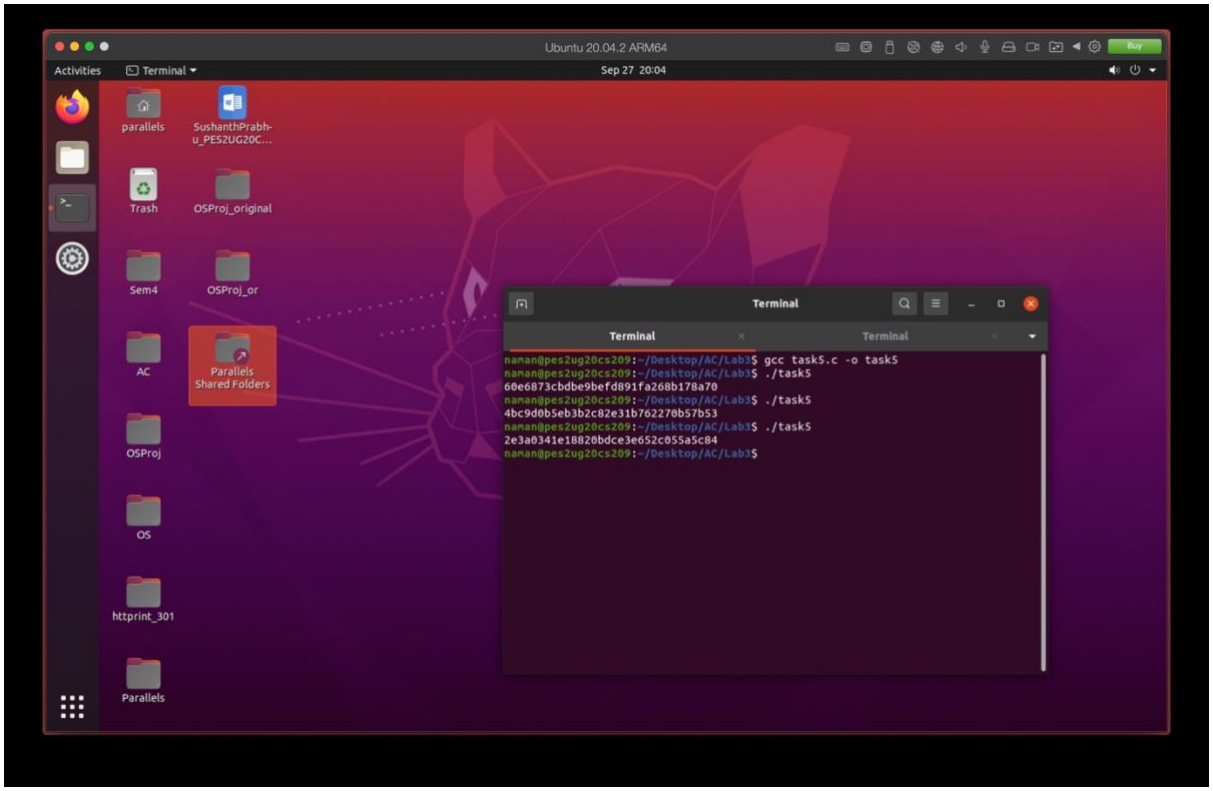
Observation: hexdump generated hexes of the entropy, which increased after a very short amount of mouse movement

Screenshot:



Observation: We note that the command ent gives us the entropy per byte, with other details about the entropy

Screenshot:


Ubuntu 20.04.2 ARM64
Activities
Terminal
Sep 27 20:04
parallels
SushanthPrabh-u_PES2UG20C...
Trash
OSProj_original
Sem4
OSProj_or
AC
Parallels Shared Folders
OSProj
OS
httprint_301
Parallels
Terminal
Terminal
Terminal
naman@pes2ug20cs209:~/Desktop/AC/Lab3$ gcc task5.c -o task5
naman@pes2ug20cs209:~/Desktop/AC/Lab3$ ./task5
60e6873cbdbe9befd891fa268b178a70
naman@pes2ug20cs209:~/Desktop/AC/Lab3$ ./task5
4bc9d0b5eb3b2c82e31b762270b57b53
naman@pes2ug20cs209:~/Desktop/AC/Lab3$ ./task5
2e3a0341e10820bdce3e652c055a5c84
naman@pes2ug20cs209:~/Desktop/AC/Lab3$