

## **Lam Dang**

### **The Cipher**

#### **How to run the code:**

```
python3 dict_decrypt.py
python3 vigenere_decrypt.py
python3 affine_decrypt.py
python3 morse_decrypt.py
```

#### **Affine Cipher**

- Using Frequency Analysis, we can view the most frequent letters in the cipher and mapping them to the most common words in English
- For irydkbkh.txt: I map T to E and C to T and I decrypt the code with  $A = 11$ ,  $B = 1$

THREE GENERATIONS OF THEM NOW HE THOUGHT HE STARED ACROSS THE BIG  
ROOM BRIGHT WITH THE LIGHT OF NOON POURING THROUGH THE SKY LIGHTS  
SAW THE BOY SEATED WITH BACK TO THE DOOR IN TEN TON PAPERUS AND  
CHARTS SPREAD ACROSS A NELL TABLE

- For vvcenyzc.txt, I map L to E and H to A and I decrypt the code with  $A = 1$ ,  $E = 7$

MORSECIPHERALPHABETREARRANGEMENTUQVIMXRTZSWGCKAFPOHDBLNJEY

#### **Morse Code:**

- For ppnbtqib.txt, I used the morse alphabet arrangement from the decrypted vvcenyzc.txt to decrypt.

THERE WAS THUFIR HAWAT THE OLD MENTAT MASTER OF ASSASSINS WHO  
STRUCK FEAR EVEN INTO THE HEART OF THE PADISHAH EMPEROR

#### **Dictionary Code:**

- For ujuekpcv.txt, I used frequency analysis and also words such as I'll, we'd, A, I to make an educated guess to which character map to which, thus creating a dictionary of alphabet to decipher the code:

"we'd have joined each other in death," halleck said. "but i'll admit you fought some better when pressed to it. you seemed to get the mood." and he grinned wolfishly, the inkvine scar rippling along his jaw.

"the way you came at me," paul said. "would you really have drawn my blood?"

halleck withdrew the kindjal, straightened. "if you'd fought one whit beneath your abilities. i'd have scratched you a good one, a scar you'd remember. i'll not have my favorite pupil fall to the first harkonnen tramp who happens along."

paul deactivated his shield, leaned on the table to catch his breath. "i deserved that, gurney. but it would've angered my father if you'd hurt me. i'll not have you punished for my failing."

"as to that," halleck said, "it was my failing, too. and you needn't worry about a training scar or two. you're lucky you have so few. as to your father -- the duke'd punish me only if i failed to make a first-class fighting man out of you. and i'd have been failing there if i hadn't explained the fallacy in this mood thing you've suddenly developed."

paul straightened, slipped his bodkin back into its wrist sheath.

"it's not exactly play we do here," halleck said.

paul nodded. he felt a sense of wonder at the uncharacteristic seriousness in halleck's manner, the sobering intensity. he looked at the beet-colored inkvine scar on the man's jaw, remembering the story of how it had been put there by beast rabban in a harkonnen slave pit on giedi prime. and paul felt a sudden shame that he had doubted halleck even for an instant. it occurred to paul, then, that the making of halleck's scar had been accompanied by pain -- a pain as intense, perhaps, as that inflicted by a reverend mother. he thrust this thought aside; it chilled their world.

"i guess i did hope for some play today," paul said. "things are so serious around here lately."

halleck turned away to hide his emotions. something burned in his eyes. there was pain in him -- like a blister, all that was left of some lost yesterday that time had pruned off him. how soon this child must assume his manhood, halleck thought. how soon he must read that form within his mind, that contract of brutal caution, to enter the necessary fact on the necessary line: "please list your next of kin."

halleck spoke without turning: "i sensed the play in you, lad, and i'd like nothing better than to join in it. but this no longer can be play. tomorrow we go to arrakis. arrakis is real. the harkonnens are real."

paul touched his forehead with his rapier blade held vertical.

halleck turned, saw the salute and acknowledged it with a nod. he gestured to the practice dummy. "now, we'll work on your timing. let me see you catch that thing sinister. i'll control it from over here where i can have a full view of the action. and i warn you i'll be trying new counters today. there's a warning you'd not get from a real enemy."

paul stretched up on his toes to relieve his muscles. he felt solemn with the sudden realiation that his life had become filled with swift changes. he crossed to the dummy, slapped the switch on its chest with his rapier tip and felt the defensive field forcing his blade away.

"en garde!" halleck called, and the dummy pressed the attack.

paul activated his shield, parried and countered.

halleck watched as he manipulated the controls. his mind seemed to be in two parts: one alert to the needs of the training fight, and the other wandering in fly-buuy.

i'm the well-trained fruit tree, he thought. full of well-trained feelings and abilities and all of them grafted onto me -- all bearing for someone else to pick.

for some reason, he recalled his younger sister, her elfin face so clear in his mind. but she was dead now -- in a pleasure house for harkonnen troops. she had loved pansies . . . or was it daisies? he couldn't remember. it bothered him that he couldn't remember.

paul countered a slow swing of the dummy, brought up his left hand entretisser.

that clever little devil! halleck thought, intent now on paul's interweaving hand motions. he's been practicing and studying on his own. that's not duncan's style, and it's certainly nothing i've taught him.

this thought only added to halleck's sadness. i'm infected by mood, he thought. and he began to wonder about paul, if the boy ever listened fearfully to his pillow throbbing in the night.

"if wishes were fishes we'd all cast nets," he murmured.

it was his mother's expression and he always used it when he felt the blackness of tomorrow on him. then he thought what an odd expression that was to be taking to a planet that had never known seas or fishes.

### **Vigenere Cipher:**

- For `ujuekpcv.txt`, since I already know that there is a high possibility that the cipher would be in the book *Dune* by Frank Herbert, I used the book information (Name of Book, Author, Character, Location) as a combination of key to try, and figure out if there exists an n-gram repetition pattern when I try the keys. When I used "Paul" (Name of the main character, I saw a repetition of the word "Date". From then, I was able to guess the last word of the first sentence is "sleep" (from "gleep") and I was able to find the last character to the key. The key is "DATES"

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