

THE FLAME OF THE FORSAKEN



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-CHAPTER ONE-

Beginning of the Journey

In the lush green village of Aren, in the Kingdom of Malazan, Artemus trained extensively under the Sage Apsalar. It was early morning when he would wake up, exercise extensively, climb the Great Mountain Nazir and even in the thin air on the top, train, train and train... For he knew the goal that he had in his mind was not easy. After swinging his sword for hours and casting various magic spells, he would also mentally train himself, for Artemus knew that the battle he would fight could not be won by brute force alone, but he would also need to use his wits to win it. After his training routine, which was a daily job now, he returned to the hut, where the Sage stood, with his ever so serious face.

A smile broke on Apsalar's face, as he said "I have taught you everything I know. Now, as a final test to know if you are ready, you must accomplish a great feat." Artemus' face turned serious, as he knew that the task that the Sage would give him wouldn't be easy. After all, whenever the Sage felt that the Prince had reached a certain level of skill, he would give him such challenges to prove his abilities. It was in these challenges that he had spent days struggling, fought magical beasts, faced life-threatening situations, achieved the impossible by slicing through

impermeable objects. As he was lost in these thoughts, the sage continued, “You must defeat the Witch Triss who lives on top of the Mount Nazir and kill her. She is accomplished in magic as well, and it will be a true test of your abilities to defeat her.”

Artemus had heard of the witch since he was a child who lived in the Village. Some Villagers discarded her as a myth, while others were scared of her, despite her not making an appearance in over a hundred years...

Artemus, with a chiselled body like that of a lion, was ready to complete this final test. After all, vengeance makes people stop fearing even life-threatening situations, and Artemus already had a burning desire to exact his revenge - against none other than the Emperor of Malazan. None of the villagers in Aren, save for the Sage, knew where Artemus came from. It was just one day that they found the Sage tending to a child. The Sage had told them that it was the child of his distant relative, who had been martyred in the War. Not many believed it, but they didn't question the Sage out of respect for him.

Even Artemus didn't know who he indeed truly was until he was fifteen, and the Sage told him to train hard enough to have his sword slice through the Darius Boulder, that was considered unbreakable by many villages. Although the teenage Artemus did have hazy memories of soldiers marching, drowning in a river, weeping as arrows and swords swam in his way, it all seemed like a distant dream to him. As Artemus stood in front of the large piece of rock, he couldn't seem to be able to break it - one end of the rock seemed so hard that his sword seemed to shake so hard that it would break, while the other seemed so soft that his sword would get stuck in the sand-like region of the boulder. He tried hitting the stone at random points, but either the point where he tried to slice was too hard or too soft to be sliced properly. The sage

hinted - “Everything, no matter how hard or soft, has a single point of weakness.”

It was a few days later that Artemus realised that he could simply use a technique of dividing the block into two parts after each hit and hitting the part where it was more likely to find the point where he could hit the rock properly, since the soft rock kept getting harder on moving to the other side(right). Thus, if he hit the rock and it was too hard, he would choose the point to hit between the left point and the point he hit, and if it was too soft, he would hit between the right point and the point that he hit. Thus, with this approach, which he later learnt was the Binary Search, he was able to hit sufficient number of points on the large boulder to find the point where his sword smoothly sliced through it. This feat had left lot of the villagers surprised, as it was considered to be an impenetrable rock since ages.

However, it wasn't the praise of the villagers that was the reward for young Artemus. It was the knowledge of the events more than 13 years ago that was his reward for the feat. The Sage told him the truth - the King, murder, Vizier, as memories that were deep buried inside him for 13 years came flashing back. He wept and mourned the events that had conspired 13 years ago, and vowed revenge, and made this vengeance his sole driving force for the coming many years. It was that day itself when he had made the resolve - to murder the king.

Today, Artemus stood in the dark forest atop the humongous mountain, with the fog covering his vision, he cautiously stepped ahead inside the forest. He could sense a form of dark magical power radiating from one edge of the forest, and he kept walking towards the source. As he followed the source, he was encountered by a maze. He knew this was one of the traps to stop anyone from reaching the Old Witch. Since he had no scarcity of time, and the boundaries of the maze didn't seem to extend too far away, he decided to use Depth First Search to find the

exit of the maze. He used two coloured magical dust, and as he went along a particular path, he sprayed pink magical dust at each junction. When he would reach a dead end after going along a path, he would come back to the last junction where he had unvisited paths, and after visiting all the paths possible at a junction, he would put blue magical dust at that junction, signifying that he had visited all possible paths from that junction. Thus, he ended up taking all possible paths in the maze, and because of the rather easy nature of the maze, he was able to find the correct path leading out of the maze within 5 hours.

As he continued along the swampy paths, he encountered an old hut, half broken and destroyed, that seemed to be the place the village inhabited. As he neared the place, he was greeted by bolts of electricity coming from the hut.

Artemus however, was able to quickly dodge that. As he ran from one place to another to dodge the bolts, he saw a dark figure, firing these bolts while standing at the door of the hut. Realising it is the Witch, Artemus fired his fire magic at her. She was able to repel it, but as Artemus tried to close the distance between them, Artemus saw that the Witch was heaving, and was really old. However, she continued firing bolts at her target, even laughing under her heavy breathing. Artemus knew that a combination of ice and fire magic would stun her, and he fired both of them at her one after the other. And lo! The witch screamed, as she was rendered motionless. Artemus used this moment to run at her with his full strength, and hit her with continuous blows of his magical powers.

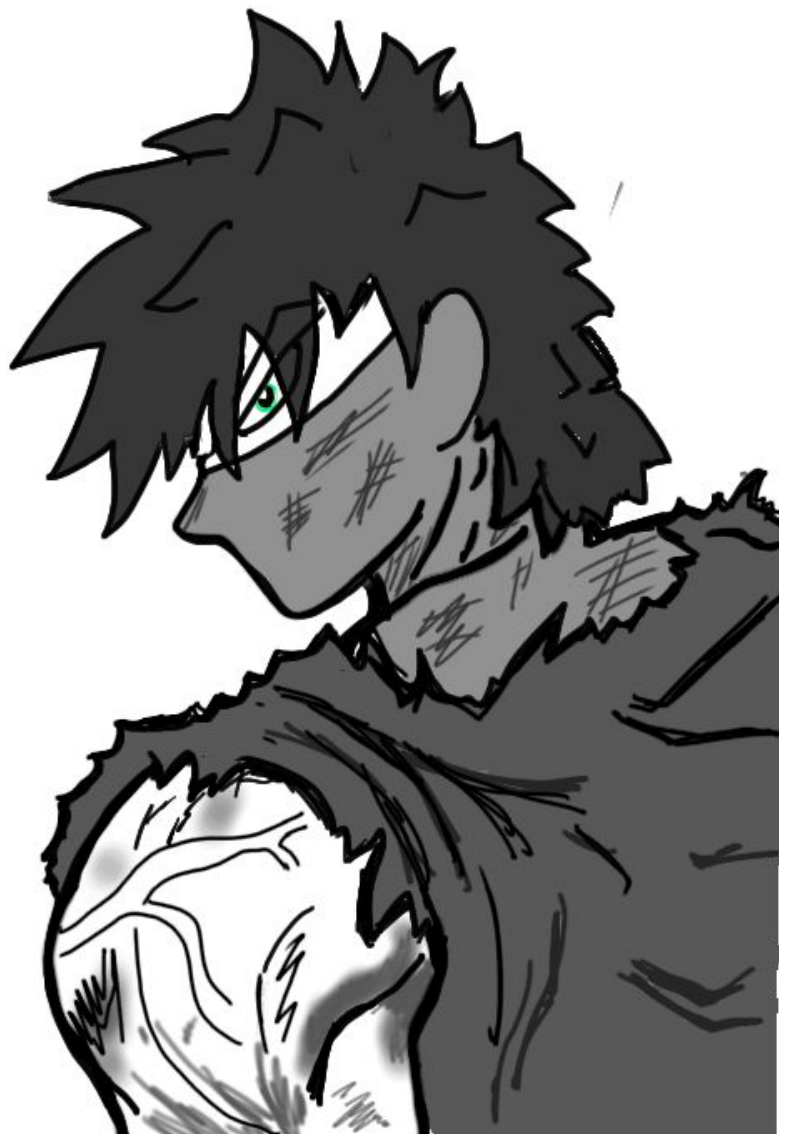
After landing blows after blows on the Witch, and disabling her powers, the witch stooped on her legs. She begged to Artemus on her knees, “Please leave me. I know who you are, I can help you. I know that the King Laseen is the one...”, but before she could finish her sentence, Artemus went into a fit of rage upon hearing the name. It was

as if his arms had moved by themselves, that he sliced his sword across, and with a high pitched shriek, the Witch's dead body lay in the hut.

Artemus was scared by how ruthless he had turned, and how he had almost lost compassion upon being reminded of the fate that was sealed for him seventeen years ago. As he descended down the mountain, he knew that he was mentally prepared to do what needed to be done. As he neared Sage's hut, he knocked on the door. The Sage greeted him, and as he saw his creation - the result of years of training, he spoke in a victorious tone - "You are ready!"

However, even with the skills that he had acquired, he knew that he wouldn't be able to take on the army that was possessed by the King. He told the Sage, "I will go to various warrior clans and villages to gather their support. Once I have a big enough army, I shall be able to take on him and have vengeance." Since the public had been rather unhappy with the rule they were being subjected to, Artemus knew that they would be a part of his mutiny against the King. However, he knew that it would be difficult to gain their trust. Despite this, he was confident that upon learning the nature of his origins, the Village heads would give him complete support. However, he knew that this was a double-edged sword, and if some wrong people were to know of it, it might heavily endanger his life.

The Sage, who knew and approved of Artemus' plan, told him "Go to the Village of Zetopia. You will be able to gather armour and weaponry of the highest quality from there. The people there will also show you the path to other Villages, that would be highly beneficial in your journey." It was with the resolve in his eyes to exact revenge, that Artemus left for Zetopia, in a journey to defeat the King.



-CHAPTER TWO-

A Fiery Business

The journey from Aren to Zetopia took Artemus over 5 days to cover. Zetopia was a village known for making the best weapons and armor in the whole Malazan kingdom. Artemus has heard that the people of Zetopia are known to be kind, lively, and full of happiness, and were the most hospitable citizens in the entire Malazan Kingdom.

On the way to the village, Artemus saw that the farms and fields were on fire and some people were leaving the village looking sad and in sorrow. Outside of the village, Artemus saw people carrying the bodies of their family members and friends. Their bodies were out of shape and burnt. On his arrival, Artemus saw that the village is very different from what he has heard and expected. Instead of being lively and happy, the villagers were scared.

Artemus saw villagers loading up their carts to abandon the village. Although some villagers were leaving, most were guarding their houses with stones and metal scraps. Artemus reached one of the villagers, Carak, to ask if he could spend the night at his house. Carak happily accepted his request and guided him to the guest room. Artemus freshened up and joined Carak for dinner. At the dinner table, he

enquired Carak about the weird things he saw going around in the village and why the people were leaving. Carak morbidly told Artemus “It all started happening a few weeks ago when the fire breathing dragon Septimus showed up in the village. First, he started burning the forest nearby but then he reached our farmlands and started burning the crops. When people tried to stop him, he started killing the villagers. Due to his wrath, people are leaving the village.” Artemus asks “Then how come you are not leaving the village?”. Carak replies “Everything I have done and everything I own is in this village even my whole family is here, this is my childhood ”. Artemus felt bad for the poor villagers who couldn’t face the dragon and were suffering because of it. After the dinner when Artemus was in bed he couldn’t stop thinking about the sorrows of Carak and the villager. So he decided to put an end to it. Artemus decided to ask Carak about the hideout of the dragon Septimus first thing in the morning.

Then the next day when Artemus woke up, Carak was preparing breakfast. Artemus asked him where he could find Septimus. To this, Carak replied hesitantly “Septimus has taken residence in the caves in the center of the forest. He stays inside during the day and comes out at night to hunt and destroy the farms. The area around the caves has been evacuated”. Carak then served Artemus breakfast. Artemus ate the breakfast silently formulating the plan in his head. He then thanked Carak for his hospitality and left to seek Septimus.

After 2 hours of walking in the forest, Artemus finally spotted the mouth of a humongous cave. He couldn’t see the dragon from outside, which meant that Septimus was deep inside the cave and Artemus would have to go into the cave to fight Septimus. As Artemus walked towards the cave, he saw that the entrance was closed with 2 huge stone gates. He tried to push the gates open but they didn’t even budge. Artemus stood there wondering when he saw an old man cutting a tree nearby. Artemus went to the man and asked him about the cave and how to

open the door. The old man looked at Artemus and said “This is no ordinary cave. It is a magical cave inhabited by the mighty dragon Septimus. Only a fool would want to enter this cave.” To this, Artemus said, “I wish to kill the dragon and save the villagers”. The old man started laughing but when he saw the determination on Artemus’ face, he stopped and said “Fine. I’ll tell you how to enter the cave but I must warn you it is no easy task. On the right-hand side of the cave door, you will find a table carved in rock. On the table stand 3 poles with one of the poles having 5 rings arranged in smallest to largest in size. If you succeed in moving all the 5 rings from the first pole to the second pole in the same increasing order, the gates shall open for you”. Artemus wondered about what the old man had said. It seemed like a pretty easy and straightforward task. But then the old man continued, “But here’s the catch. You can only remove one disk at a time and the disk should be present in any one of the three poles at all times.” Artemus now understood that it would be an extremely difficult and challenging task, but he was determined to help the people. So he thanked the old man and went to the cave doors again.

When Artemus arrived at the entrance of the cave again, he spotted the table with 3 poles. As the old man had told him, there were 3 poles with 5 disks on one pole. He studied the puzzle for a while and formulated a strategy in his head. Once he was confident of his plan, he picked up the smallest ring from the first pole and placed it on the third pole. Then he picked up the second-smallest ring and placed it on the second pole. After that, he picked up the smallest ring which he had placed on the third pole and placed it on the second one at the top of the second-smallest ring. Then he carefully picked up the third ring from the first pole and moved it to the third pole. He then took the smallest ring from the second pole and temporarily put it on the first pole. And he removed the second ring from the second pole and placed it on top of the third ring in the third pole. Finally, he picked up the smallest ring which he had put on the first pole and moved it to the third pole. He

was pleased to observe that an ordered 3 ring tower had now been formed on the third pole. He repeated the same steps for the remaining 2 rings and soon, he had transferred the tower from the first pole to the third pole in just 31 moves! Suddenly, he heard a loud rumbling noise and saw that the giant doors of the cave were opening. He had succeeded in his first task.

As Artemus walked into the cave, he observed that the cave looked even more enormous from the inside than it had outside. The cave grew darker with every step he took. He could hear faint growling sounds as he moved deeper and deeper into the cave. As he reached the center of the cave, he saw Septimus. He was a humongous creature with dark grey skin full of scales. He had 2 huge wings which expanded in anger as it laid its huge slit eyes on Artemus. Tiny puffs of smoke blew out of the dragon's nose as it prepared to blast fire at Artemus. But Artemus rolled on the ground at the last moment and dodged the dragon's fire. This seemed to make Septimus even more furious. Artemus realized that he must use his magic spells to defeat the dragon. He knew 2 different types of spells. One was a lightning spell and the other a fire spell each of which dealt damage equal to their power. But there was an additional advantage to using the lightning spell, if Artemus casts a lightning spell, then the next spell he casts does double damage. Septimus shot fire at him again, but this time Artemus took cover behind a small boulder inside the cave. He used this time to recall the spells he knew. He knew three spells from his training, a fire spell of power 12, a lightning spell of power 1, and another lightning spell of power 8. To defeat Septimus, Artemus must cast the spells in an order that would inflict maximum damage. As Septimus was bellowing in the cave trying to find him, Artemus stayed hidden behind the boulder and used this time to think of all the 6 possible combinations for casting the spells. When he was ready with his strategy, he stepped out of the boulder and ran across the cave towards Septimus. He thought that the

best solution would be to *brute-force* among all the possibilities, and find the order which would carry him to victory.

As Artemus was running towards Septimus, he cast his lightning spell of power 1. The dragon was taken aback by this but since the damage was of only 1, Septimus remained unaffected by the attack. It started charging towards Artemus with even more fury now. Artemus used this opportunity to cast his lightning spell of 8, which did damage of 16 as it was cast after a lightning spell. Septimus was tossed backward by the force of the spell. It crashed against the wall of the cave. Septimus stared at Artemus, its eyes full of enraged fury as it prepared to blast fire at Artemus. But Artemus cast his fire spell of power 12 before Septimus could even move. Since it was cast after a lightning spell, it did a huge damage of 24. All spells combined did damage of 41 on Septimus which was more than it could bear. Septimus wailed loudly as it burnt down and soon it was nothing more than a pile of ash at the corner of the cave.

-CHAPTER THREE-

The Drought Dystopia

Artemus covered his eyes as he stepped into bright sunlight as he exited the cave after killing Septimus. He saw that the cave was surrounded by all the village people who had gathered there after hearing the terrible noises made by Septimus. They all stared in awe at Artemus as he told them that he had killed Septimus. Carak stepped out of the crowd and hugged Artemus and said, “Thank you very much Artemus. We are forever indebted to you for saving our lives. Is there any way we can repay you?”. Artemus smiled and said, “I didn’t kill Septimus to get something in return. I simply wanted peace and happiness in this village again. However, I am raising an army of my own to overthrow the king and once again restore peace and justice in these lands. If any of you are brave enough to support me with this cause, I request you to please join my army and help us in bringing happiness again.” The villagers shuffled nervously and whispered among themselves. Finally, the old man who had told Artemus about the magical entrance of the cave, stepped forward and said, “While we completely support you in your cause to help all the people, you must understand that we not young and powerful like you. We cannot embark on adventures with you and fight mighty beasts. But our village is known

for its skilled craftsmen. We can provide you with all the weapons and supplies you need for your cause. We wish you good luck and pray that you succeed in your mission.” Artemus nodded and said, “Thank you. I am very grateful for your help.”

Artemus bid farewell to the villagers and started walking out of the forest to continue his journey. He was about to exit the forest when he heard quick footsteps behind him and his name being called out by someone. He turned around to see Carak and a young man running towards him, “Artemus wait!”. Carak came to him out of breath and said, “Artemus, This is my friend Straff. We are very inspired by your motives. You are very powerful. You succeeded in defeating Septimus and we believe that you shall succeed in overthrowing the king as well. We wish to support your cause and help you in any way possible.” Artemus was impressed by the strength and determination shown by the two men. Artemus smiled and said, “Thank you Carak. I need men and women like you who are courageous and strong-willed.” Carak beamed at this and the men started on their adventure together with Artemus.

They walked for about 5 hours. They stopped to rest under the shade of the trees and ate fruits and berries that they found on their way. As they were walking, they came across a river. Artemus looked around trying to find a bridge or a passage to cross the river. But all he could see was a nearly broken old boat. The water was flowing very heavily and it seemed very deep. Trying to cross the river by swimming was impossible. Artemus started walking towards the boat and said, “Looks like the only way to cross the river is by using this boat.” Carak seemed to get shocked by this and said, “But this boat seems very old. There is no way that it can support all of us.” Carak nodded and said, “We have to find some way so that all of us are able to cross the river in a way that we use the boat minimum number of times possible.”

Artemus inspected the boat and turned towards the men and said, "The boat looks like it could support 100 kg weight. I weigh 50 kg, Carak weighs 50 kg and Straff weighs 100 kg. We need at least one man on the boat to steer it and make it cross the river. I think I know how we can do this. Just follow as I say." The 2 men looked at each other and seemed confused but they nodded and did as Artemus told them. First, Artemus and Carak got on the boat. They both weighed 50 kgs each. The boat wobbled a little but managed to get rowed across the river. Next, Artemus dropped Carak on the shore and went back towards Straff who waited on the other side. Artemus got off the boat and asked Straff to get on the boat alone. Straff rowed the boat and soon reached the opposite shore to Carak. Straff got off the boat and Carak got in the boat once again and rowed it across the river towards Artemus. Artemus got in the boat along with Carak. Since their combined weight was 100kg, the boat was able to support their weight. They quickly rowed the boat across and hopped off the boat. All 3 of them had managed to get to the opposite shore in just 5 iterations! Straff and Carak were awestruck by Artemus' intelligence as they continued walking.

As the sky started to get dark, they decided to go to a nearby village to seek shelter for the night. Carak knew of a village at about half an hour distance. Carak described the village to be known for its greenery. Carak said that he had heard many stories as a kid that this village was filled with luscious fields of all varieties of fruits and vegetables and that it was the number one village with maximum food supplies in the entire kingdom. Artemus was excited to see the village and its beauty now. But as they got closer to the village, they noticed that the grass had been dried out and was brown in color. As they kept walking, they saw that there were many trees which once might have been very green and full of fruits, but now they were completely withered and dry with not even a single leaf on them. The entire village seemed to be hit with a massive drought.

They soon reached a house. They knocked on the door and an old woman opened the door. Just like the trees outside, she looked very bony and dehydrated. Artemus was confused but he said, “We are travelers. We want to seek shelter for the night. Can you help us?”. The woman seemed apprehensive at first but then slowly opened the door to let them in. They walked into the house to see a small room with no furniture. There was an old man sitting in the corner of the room and eyeing the 3 men. The old woman said, “You may use the side room to sleep tonight. I’m afraid I don’t have any food available for you.” Artemus nodded and said, “Thank you for taking us in. If you don’t mind, can I ask you a question? Why are all the trees and plants in your village dry? There was a river nearby and yet it looks as if your village has been hit by a drought.” The old woman’s expression got grim and she said, “There was a time when our village bloomed with greenery and happiness. But some time ago, some thugs came and blocked our village river with huge stones and boulders. This completely stopped the water flow in our river. Our water supply was empty and thus all the trees and plants dried out.” Artemus said, “We can help you. We three, along with any other young men from your village can push and remove those boulders.” The old woman smiled but there was sadness in her eyes. She said, “It is not as simple a task as it sounds. Our entire village tried endlessly to remove those boulders but nothing worked. You see, the boulders are protected by magic. There is a spell written on the stones in a language foreign to us. The boulders can be moved only if the spell is deciphered. Many scholars tried and failed at the task. I suggest that you stop thinking about this and continue with your journey. Leave us to our doom. There is no solution to this.” With this, the old woman walked out and went to sleep.

Artemus couldn’t sleep that night. Whenever he closed his eyes, he was haunted by the sights of the dried out trees and the sad and hollow faces of the villagers. He resolved that he would solve this problem by any means possible. The next morning, Artemus told Straff and Carak

about his intentions to break the dam. They seemed apprehensive but didn't say anything. They got up and thanked the old man and woman and went towards the dam.

When they reached the dam, they could see huge boulders blocking the flow of the river. Artemus stepped closer to the boulders and saw, as the old woman had mentioned, a text written in a language that seemed similar to English but wasn't. He turned towards Carak and Straff and said, "This dialect seems to be the subset of our language, but the order of the alphabet is different from what we use. There must be something else that we are missing. Something that helps us understand this language. Let's split up and search the forest for anything that helps us."

After a few minutes of searching, they returned to the dam. Artemus and Straff claimed to have found nothing of relevance. But Carak produced a torn-up book and handed it to Artemus and said, "There was a small cave nearby, I went inside to check it and found these pages hidden behind a rock." Artemus studied the pages. There were 3 pages with some random words written on them. After inspecting the pages, Artemus concluded that "These pages seem to be a dictionary for the ancient dialect. It has the same 3 alphabets that were used in the spell 'a b c'. Fortunately, the pages still have their page numbers written on them. We need to use this ancient dictionary to reconstruct the ancient language." Artemus looked at the pages, the first page was numbered as 2 and had the words 'b', 'b', and 'bbac' on them. The second page was numbered 0 and had 'a', 'aca', and 'acba' written on it. The final page was numbered 1 and had 'ab', 'c', and 'ccb' written on it.

So first, Artemus set the 3 papers according to their page number. Then he studied the words written on them. Since a dictionary is always arranged alphabetically, he studied the order of the words and soon

concluded that the order of the alphabets in the ancient language was ‘ a c b’. He rushed towards the spell and deciphered the language with the order of alphabets that he has concluded. There was sudden movement and one of the boulders fell down and water started flowing from the hole. Soon all the boulders started falling one by one as the water pushed it from the other side. The last of the boulders fell and the water started flowing in the empty river.

Artemus, Carak and Straff followed the river and reached the village. The entire village was standing at the shore and staring at the river. The children were dancing and cheering while the elderly were staring at the water unbelievably. The old woman came rushing from the crowd towards Artemus and looked at him and said, “How did you do this?” Artemus replied, “The spell was written in an ancient dialect that is a subset of our language. We found a torn-up dictionary and we used it to decipher the language and decode the spell.” Tears welled in the old woman’s eyes and she said, “We can never thank you enough young man. You have restored happiness in our village.”

The head of the Village also profusely thanked Artemus, and upon coming to know of his ultimate goal, assured him of complete support of the villagers in his journey. As it was getting dark, Artemus and Carak sat at a campfire, and all the villagers were celebrating with music and dance around it. As this fire illuminated the faces of both Artemus and Carak, Carak looked at Artemus and asked, “Who you truly are, and why do you want to overthrow the King?” Artemus' eyes turned dark, as he took a deep sigh to turn to Carak.....

-CHAPTER FOUR-

The Tragedy

As Artemus breathed a deep sigh on Carak's question, he looked into his eyes. Carak sees pain and agony in Artemus' eyes, as he begins, "Would you believe me if I were to tell you that I'm the Crowned Prince of Malazan?". As the light in flames illuminated the anger on his face, Artemus continued, "My father, the King of Malazan ruled over this land peacefully. He was loved by the citizens and the nobles of the country alike. Little did we know, his most trusted Vizier, Laseen Baratheon would be the one to turn against him. With the growing age of my father, he gave more and more power to Laseen, as he tried to gain more and more influence over the Kingdom.". Carak was nodding, as the Prince continued, "One day, during the darkness of night, as dark as his heart, after having raised an army just to usurp the Kingdom, Laseen barged open the gates of the Castle. Having been entrusted with the security of the Castle, he made sure that there were no guards in his path. After slicing my father's throat in half along with his treacherous army, he proceeded to my quarters to kill me."

As the Prince recalled the deeply buried childhood memories, he told Carak the unique arrangement that had been set up to enter his room. A display - ever so magical that had been set up by the very same

sage that would train the Prince years later, would show a pattern containing just 0's and 1's. Under the display, one had to enter the minimum length of the pattern that would be obtained after removing all the adjacent 0's and 1's from the string. This looked something like:

DISPLAY: 1100

PASSWORD: 0

1100 → 10 → (empty)

DISPLAY: 11101111

PASSWORD: 6

11101111 → 111111 (length 6)

Since the actual pattern on display was ever so long that any man could count, it seemed impossible for anyone to be able to try all the combinations of removing and not-removing adjacent 0's and 1's that it would take years for anyone to solve. The Vizier, also tricked by this magical measure, stroked his goatee in disbelief, as various of his soldiers tried to decode this puzzle. Hearing the commotion on the other side of the door, the Royal Guard, Mikhaekl breathed a sigh of relief. He had heard the army marching inside and had used this Emergency Safety Device to stop the Vizier from reaching the infant prince. However, he knew that it was only a matter of time before the Vizier would barge in. He made use of the secret passage that connected the Prince's room to the ground floor of the palace to escape with the Prince.

On the other side of the door, the Vizier exclaimed to himself, "This is a trap. The order of one's and zero's is irrelevant, and so is the 1 and 0 that are taken to make a pair. Any 1 and 0 in the string will be combined. The password is simply the absolute value of (Number of 1's - Number of 0's)." It was indeed the case, and as the Vizier began counting the 1s and 0s in the ever so long string, he laughed and entered the PASSWORD 41.

As Laseen, with his army marched into the Prince's quarters, expecting to slay the Prince and completely overtake the Kingdom, he was instead greeted with an empty room, devoid of life. He then noticed a closed door of the secret tunnel, and shouted to all his guards to form a barrier around all entrances, trying to catch the only thing that could stand in his path of becoming the King.

Mikhael knew that he had only one chance to dodge the barrage of the soldiers that stood in his path. As he looked at the various gates in front of him, those that would lead to freedom, he tried to find the entrance which would have the minimum resistance - the least number of soldiers.

The soldiers at each gate in front of him kept increasing and decreasing at a rapid rate - some soldiers fighting the few loyal soldiers left in the castle and reduce the number. In contrast, some more treacherous soldiers kept coming, suspecting they saw something. Mikhael knew that he had a tiny time frame to make an escape. As he saw the loyal soldiers die in front of his very eyes, he decided to use Segment Tree to find the most optimal tunnel to escape from, and to process the incoming and the outgoing soldiers.

The segment tree is represented as an array, with each element being the number of soldiers in a gate. Now, a segment tree can make updations of insertions and deletions to find the final array values in $O(\log N)$ complexity.

We compute and store the sum of the elements of the whole array, i.e. the sum of the segment $a[0 \dots n-1]$. We then split the array into two halves $a[0 \dots n/2]$ and $a[n/2+1 \dots n-1]$ and compute the sum of each halve and store them. Each of these two halves in turn also split in half, their sums are computed and stored. And this process repeats until all

segments reach size 1. In other words we start with the segment $a[0 \dots n-1]$, split the current segment in half (if it has not yet become a segment containing a single element), and then calling the same procedure for both halves. For each such segment we store the sum of the numbers on it.

We can say that these segments form a binary tree: the root of this tree is the segment $a[0 \dots n-1]$, and each vertex (except leaf vertices) has exactly two child vertices. This is why the data structure is called "Segment Tree", even though in most implementations the tree is not constructed explicitly.

From this short description of the data structure, we can already conclude that a Segment Tree only requires a linear number of vertices. The first level of the tree contains a single node (the root), the second level will contain two vertices, in the third it will contain four vertices, until the number of vertices reaches n . Thus the number of vertices in the worst case can be estimated by the sum $1+2+4+\dots+2^{\lceil \log_2 n \rceil} = 2^{\lceil \log_2 n \rceil+1} < 4n$.

The height of the Segment Tree is $O(\log n)$, because when going down from the root to the leaves the size of the segments decreases approximately by half.

So, he created a segment tree, to store information about the number of soldiers at each gate. At every death or new arrival of soldiers he would update the segment tree.

Finding the opportunity when he realised that all loyal soldiers were massacred, and now the resistance in each gate would only increase, he uses the segment tree algorithm to find the most optimal gateway. Upon discovering that the most optimal path to escape would be from Gate No 5, he quickly rushed to it, the prince in his arms.

Mikhael rushes with his sword in front of him, and the infant prince protected by a shield, killing everyone that stood in his path. Many arrows and swords landed blows at him, shot by the treacherous soldiers, who despite once being loyal to the Royal Blood that was flowing in the Prince's veins, now ran to murder the same Royal Blood. As Mikhael ran through the extensive lands, dodging whatever arrows he could, he saw a faint ray of escape - the untamed river Chankula. Running as fast as he could, he plunged into the ferocious waters and held the weeping child high so that he could breathe. The rumbling water hit against his deep wounds, and as he shouted in agony, which went unheard, he was happy that the Prince might even be saved. The river had various branches and tributaries, and even the soldiers who rode horses couldn't follow each branch to eliminate the threat that they wanted to kill. Afraid that the Vizier might kill them, they unanimously decided to tell him that the Prince was killed and dumped in the river, lest they could lose their lives.

Upon hearing about the death of his only remaining enemy, Vizier laughed in victory. Since the only people who had witnessed this treacherous act by the Vizier were now all dead or had alleged their loyalty to him, he decided to fake the truth about the fate of the King to gain his popular support. At the very break of dawn, it was announced throughout the kingdom that the Emperor had an important announcement to make. As the public huddled to listen to what the Emperor whom they held in high regard had to say, they were instead greeted by the bleak faced Vizier, who stood where the King once stood to address the public. With his voice ever so sombre, he said, "It is with great displeasure that I must break this to you, the King is no more. A fire broke out in the castle yesterday night under mysterious circumstances, engulfing the King's and the Prince's quarters in flames. Despite the best attempts of the soldiers, they could not be saved. Emperor Arsalan's death was a tragedy, but to lose Artemus, who had

barely begun to live..... For me, it's a deep, personal loss. So it is with a heavy heart that I assume the throne. Yet, from out of the ashes of this tragedy, we shall rise to greet the dawning of a new era.....” As the Vizier finished his speech, the majority of the crowd broke down in tears upon the death of the King.

It was in this way that the Vizier overtook the throne that he had looked at with lusty eyes for so many years. As he happily occupied the throne, he even used his dark magic, that he had practised for so many years, to influence the nobles and clergy in his favour. With the support of the public for being a tragic figure, the support of the nobles through his trickery, and death of the Prince who was the only one that could endanger his plans, the Vizier was now assured of occupying the throne without any hindrance. Little did he know that in the other part of the Kingdom, the very seed that would challenge him was already sown.



-CHAPTER FIVE-

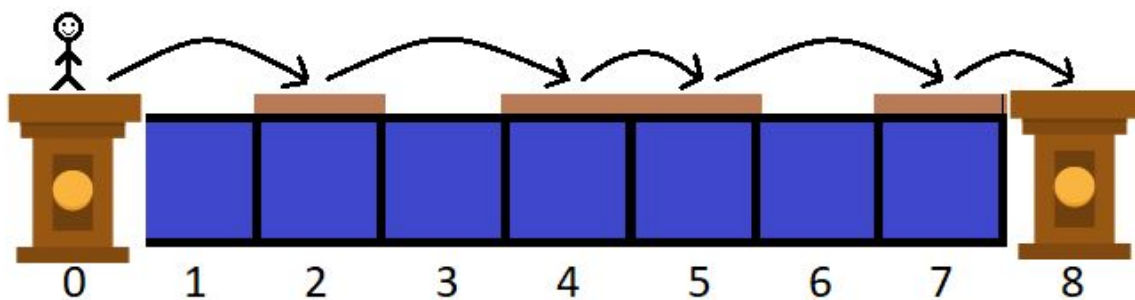
The Forsaken

The cold waves lashed against his open wounds - the pale light of the moon that shone above him seemed to twinkle in his eyes - there was excruciating pain in his limbs and body - but he was ALIVE. His hands, despite having bled so much, still carried the young Prince above the water. As Mikhael frantically tried to see what came ahead of him - he saw a bright light..... A VILLAGE. He gathered whatever strength was left in his body and grabbed the nearest shore and laid down there. However, the village was on the opposite side, and he saw a pile of wooden logs in front of him - it was a *broken* bridge. Soon, he realised that it was impossible to reach the other end..... until he saw three such bridges.

Being exhausted, he knew that he could only jump 2 meters at a time, and he could see logs of various lengths one after the other. The complete river was 7 meters wide. However, even with the limited strength that was left in his body, he could conjure up magic to move the logs left or right. He began to think of a way to reposition the logs such that he could reach the other end. He realised that it was indeed a simple approach, where he could greedily move the logs so as to reach

the other end. He went in front of the river, the baby still in his hands, and saw the logs of length 1, 2 and 1 in front of him.

He concluded that the order in which the logs were placed didn't even matter - all he needed to do was place a log so that after making a max jump of 2 meters, he would land on a log. Thus, he keeps the first 1-meter log at a 2-meter distance from the end of the bank where he stood, and made the jump, trusting his algorithmic skills. Following the approach, he kept the next log of 2-meter length at 4th index, again at a distance of 2 meters. Now, he walks along the 2-meter length, and again places the final 1-meter block at the distance of 2 meters, and can quickly cross the barrier of the river that stood between him.



As delighted he was at crossing the river, he realised that using magic indeed took a heavy toll on his body, and he was unable to move his body any further.

In the small village that was illuminated by the moonlight and the bonfires around, he felt comforting hands on his otherwise frozen body. As he looked up, he saw an old wrinkled figure, clad in traditional white clothing. The soldier felt some more warmth - he was casting some healing magic upon him. However, both Mikhael and the old man knew that it was of no use - the arrows that he was shot with were enchanted as well. With the few moments that he had left to live, he told the Sage as he handed him the Prince, "He is the last blood of the Royal Family. The Vizier - he is evil and has killed the king and attempted to kill the Prince. Anyone who knew about his treachery was killed. Please save the

Prince, and avenge the Kin.....” Realising that the poor soldier died saving the Prince, the old sage closed his lifeless eyes. However, the Prime Sage of Teblor, Aphrahat knew that it wasn’t mere coincidence that the Prince got here. It was fate itself. He was the Royal Alchemist and Magician and had served the royal family for three generations. However, with the Vizier gaining more and more power, he tried to get rid of all the Magicians who could prove disastrous to the evil schemes that he had been formulating for so long. The king couldn’t even smell how the Vizier had been planning this all along, and Sage Aphrahat had been suspicious of his schemes since forever.

He swore upon the body of the soldier that lay in front of him, to raise the Prince to be a mighty warrior, and one day bring back the throne to its rightful owner. Thus began the journey of training and raising of the young warrior prince.

As the Prince grew, Aphrahat subjected him to more and more training. He also made him maintain a sharp mind - making him solve numerous algorithmic puzzles. When the Prince was merely a child, he would give him challenges that even the wisest of the nobles wouldn’t be able to solve. The Prince, being five years of age, faced a long row of balls, with numbers all over them, and he would be asked to arrange them correctly. The window of time to arrange them properly kept decreasing as he would succeed. The Prince earlier used a technique - that he would later learn was called *Selection Sort*, where he would take the smallest ball, and place it in front at its correct position, and repeat this procedure for the remaining $n-1$ balls. Thus, when he would face the balls:

64, 25, 12, 22, 11.

He would scour through all the five balls to find the smallest one, which was 11, and place it in front, giving him

11, 25, 12, 22, 64

Repeating the process, he would find the smallest numbered ball in the last four balls, which would turn out to be 12, and place it in front, giving him

11, 12, 25, 22, 64

Repeating the process for all the balls, he would get

11, 12, 22, 25, 64

11, 12, 22, 25, 64

11, 12, 22, 25, 64

Thus, he was able to quickly complete the challenge when the number of balls that lay in front of him was rather small, and he was able to keep completing the challenge in lower and lower bounds of time. However, the real challenge came in when the number of balls increased too much, and he didn't have time to look at all the balls that lay in front of him, find the smallest ball and keep it at the correct position. He trained to run faster, but it was to no avail. His Master, Aphrahat told him, "The problem is not with your body, but with your technique..... You must not attack the balls as a whole, but must **divide and conquer.**"

Artemus pondered for days upon days on this statement, and it was only when he realised what the Sage actually meant that he exclaimed - "YES."

The next day, Artemus decided to divide the collection of balls into two halves, 16 to 8, 8 to 4, 4 to 2, and finally 2 to 1. Now, he knew that all the segments of length one were already sorted. Next, he merged all pairs of segments of length 1. While merging these pairs, he would compare the first element in the unsorted parts, and place the minimum one in front out of these. As he would merge to obtain sorted segments of length 2, he would repeat the process for all the segments of length 4, 8, 16.... Thus, he had to traverse through the whole list 4 times only, and he was able to sort it. In the previous case, he had to go through the whole line of balls a lot more times. Thus, while the complexity of

Selection Sort was $O(N^2)$, that of Merge Sort was $O(N\log N)$, and so, Artemus was able to sort even the longest arrays with very fast speeds. So, when the Sage presented him with a large number of such labelled balls the next time, he was, to the very surprise of sage able to use this technique to do it!

The Sage was impressed that Artemus had so quickly discovered the solution to such a tricky challenge. He finally knew that the Prince had the potential to reclaim his Kingdom and to lead the resistance against the treacherous King. As the child Prince happily approached the Sage, the Sage said to him, “You certainly are the Royal Blood. One day, when you pass all my tests, I assure you, I shall tell you the truth.....”

After this day, the Prince’s training became only harder and harder. The Sage taught him various kinds of Magic spells - healing magic, fire magic, lightning magic, accompanied by the knowledge of mental skills that would always prove ever so necessary in times of conflict. It was only after several years of training, that the sage would tell him the reality of his pasts- when he would begin training for REVENGE.

-CHAPTER SIX-

The Sister's Betrayal

Felisin watched intently as the priest walked over in her direction. Bound in shackles and having a bleak and horrendous view of the impending future, seeing a familiar face brought a strange feeling of happiness to her. Even a ray of hope that her freedom and dignity will be returned, though that was as faint as an assassin's footsteps. Even the landscape around her provided a sense of dread, as she could see naught but barren lands all around her, seeming to stretch to eternity.

The priest was now closer. The two solitary soldiers who were escorting Felisin and the rest of the shackled slaves were in internal conflict about their course of action with the priest. They were travelling in an abandoned and lawless land. Any wealth travelling through this land mysteriously disappeared and was never found. Hence most merchants and travelling bands preferred to use other routes. Mysteriously enough the bandits inhabiting this land found no need for slaves. Many slave traders would therefore use this path to extricate themselves of the tolls and taxes they would otherwise face on different paths. Most would survive the harsh landscape, most, but it was a risk worth taking.

The priest though clearly was not a slave trader, signifying him to be dangerous and powerful. The soldiers faltered, wary about this mysterious appearance. As if sensing their doubts, the priest said “Fear not, soldiers of Malazan. I come not for disputes. But rather to interact with a particular slave you are carrying.”

“And what interest may you have in slaves. O priest? These are but ill-fated humans destined to work in the Ottoral mines north until the end of their lives.” The soldier with a scar under his left eye barked.

“Oh, it seems you are unaware of the lives of these slaves. I take it you started carrying these slaves after they were deposited on this side of the sea by Malazan’s fleets?”

“Well, even later than that, but what could be so special about a bunch of slaves. Their complete silence throughout their journey indicates that they led pretty bland lives before.”

“Ah. If only, then they would be saved from this fate. Alas, the hatred for the nobles among the commons on this side of the sea is no secret. If they talked you would have easily attributed their deaths to bandits, and none would be left by now.”

Felisin gulped in fear. Their suffering was now near. With their identities revealed they would now face the retribution that her ancestors had brought on them. After conquering the other side of the sea, the nobles had forced the previous king to impose heavy taxes on the conquered land as part of war reparations. This had only led to poverty and death, while the nobles lived their luxurious lives with the newfound money.

“What! These are nobles! Turned to slaves? Does Laseen - the Vizier turned King, share our hatred of these scumbags? And fear not priest. I shan’t kill them, for a more tortuous and miserable life awaits them at the mines. But maim them I shall.”

“You shall do no such thing. Unless you want to face my wrath, fore I will be accompanying you to the mines. Got some work in the Mine city. And now Felisin, I hope you still remember me.”

“Oh yes, priest. Even though I was young I still remember the beautiful ritual you had performed for our house. Back when father and mother were still alive, and my sister was.... still my sister.” Felisin said, the poignant memory of her sister’s betrayal coming back again.

After his brother had deserted the army, which was still a debatable claim, the family had broken into ruins. Father had suffered a heart attack right on hearing the devastating news. Mother’s demise had followed in his wake. That left only her and her sister. And she had not expected the betrayal that would occur even when they were freshly mourning the catastrophe.

She still remembered it as clearly as the back of her hands. She was sleeping comfortably in her linen bed, in her beautifully decorated room when she was suddenly woken up by the hammering at the door. It was suddenly broken open and four soldiers sprawled into her room, took her by surprise and cuffed her hands. She was in utter shock, unable to decide whether to mourn about her untimely arrest or her family’s sorrow. In such a trance was she, when they took her to a line and connected her shackles to the chain connecting all those standing in the line.

She looked around for a sign of her sister, her final ray of hope. *Atleast I get to die by my sister* she had thought at that time, her last anchor

to sanity. But to her utter dismay her sister, Travore, was nowhere to be found. Her mind raced with dark, dreadful thoughts. What had happened to her sister? Had she been assigned to some other slave consignment, or worse, was she She was about to go into another sorrowful trance when she saw a familiar face sitting on a horse. Travore! And that too on a horse! She was brimming full of joy. At last her savior had finally arrived, she would finally free her and she would be back in her house in no time, considering her arrest to be naught but a bad dream caused due to some erroneous soldiers. But alas it was not to be.

“Adjunct Travore, all the treasonous and corrupt nobles that you had enlisted in your message have been bound and chained. On your order, their transportation to the Ottaral mines shall start.” One of the soldiers near Travore said in a submissive, respectful manner.

Adjunct, oh what luck! My sister is now right hand to the incumbent king. Now finally I will be able to freely walk the streets of the capital without anyone calling me a traitor. Felisin thought, her mind filling with happiness faster than a leopard’s pace. Now all that was left was for Travore to have a glance at her, be shocked, then call her out and everything would be normal again.

“Sis, I am here”. Felisin shouted loudly. Travore made no reaction to it.

A little shocked, Felisin shouted once again, “Travore, it's me Felisin, They have chained me too.”. At this Travore turned to her direction and glanced at her.

“Perhaps my sister has forgotten that she is now a slave. Soldier grant the girl fifty lashes so that she may learn her new role and treat others with respect.” Travore said calmly.

On hearing this word, Felisin's mind and sanity shattered like fallen glass. She could no longer make any coherent thoughts, her mind filled with despair and dread. And so she had quietly and with little self-awareness made the journey to her destined location, where she was to work as a slave for the rest of her life. Until now, when she saw a familiar face and some sense of her self-awareness returned.

"Well yes times change my dear child. Your family is held in a high regard nowadays. Although that has come at quite a cost. " The priest said.

"Alas, I think it was necessary. My family's name is more important than me." Felisin said. She had a strange feeling for her sister. It was not hate, but something different. It was as if that hate had been wrapped with the layer of knowing that the hate was born due to vital and necessary actions. She had succumbed to the fact that she would now work as a slaved miner for the rest of her life. An imperative sacrifice was what she thought of herself.

"Well that is debatable. Anyways I am Hood. I had given a lifelong oath to your father to watch over his children once he was gone. Your brother is most likely dead, your sister doesn't seem to need any protection. You though seem to be in the most dire danger." The priest, his name revealed to be Hood, now said.

"Holy one, I have accepted my life as a miner. There is no need for any protection now. I will work as a slave for the rest of my life, my sacrifice a vital one."

"Well I cannot stop you if you willingly want this life. Nevertheless I shall watch over you for the first two months of your new, despondent life. If all seems well then, then I shall leave you."

“Very well then. Although I have nothing of value right now, so I can only give you my thanks.”

“No need” Hood said. And so they continued in their journey towards the slave minetown.



-CHAPTER SEVEN-

The Assassin's Catastrophe

Moravid covered his eyes from the bright sunlight as he walked through the streets of Brittania. He was going to the local carpenter to buy a gift for his 6-year-old son. The young child had taken up an interest in swords and weapons, just like his father. Morvarid had plans to train the boy and make him an expert at using weapons and to one day, grow up and fill his father's shoes. Moravid was perhaps the most powerful man in the kingdom. The late King of Malazan was so impressed by Moravid's sword skills that he had hired Moravid as his personal assassin. Moravid had come to respect the late King greatly. He believed that the King was one of the justest and most noble man to ever rule Brittania.

As he walked, many of the villagers smiled and waved at him. He was even stopped many times by small kids who had wanted to shake his hand. Moravid was used to receiving this appreciation from the people of the kingdom. While acting as the assassin of the King, Moravid had saved the lives of the people on multiple occasions. Moreover, he was a firm believer in the laws and ways of the ruling of

the late King. All this had led to Moravid gaining huge respect and appreciation from the entire kingdom.

As the dome of the castle came into view, Moravid's thoughts wandered to the Vizier now sitting on the throne in place of the King. Moravid had disliked Laseen from the moment he had first laid his eyes on the man. Laseen was an evil and greedy man whose only desire was wealth and power. The happiness and lives of the people of the kingdom were of no importance to him. Moravid never for one second believed the lie that the Vizier had told to the entire kingdom the day the King and the prince had died tragically. Moravid had personally investigated the case and could not find any sign of fire. This convinced Moravid that the Vizier had killed the king and the young prince himself and taken over the kingdom.

Moravid hated serving Laseen but he still continued assuming his position as the king's assassin as he was secretly plotting to overthrow him and restore peace in the kingdom. Moravid hated seeing the innocent people of his kingdom being tortured and treated poorly by Laseen. But Moravid was sure that Laseen was getting suspicious of Moravid's plans. Moravid had to work fast if he wanted to succeed in his plans. Lost in his thoughts, Moravid didn't even realize when he reached the carpenter's shop. He asked the carpenter to show some toys for a young child. After going through almost the entire collection of toys, Moravid finally selected a very elegant looking wooden sword and a matching shield for his son to play with. He thanked and paid the carpenter and moved on to go to his house. On the way, he picked up some flowers for his beautiful wife.

He happily walked towards his home, unable to wait to see the happiness on his son's face when he saw his new toys. When suddenly, he smelled smoke. It grew stronger as he got closer to his house. He increased his pace and almost ran to his house. On reaching, he saw

people gathered around. He looked at his house - that's when he saw that his whole house had been burnt down! It was all ashed up and smoke was rising from the walls. He dropped the toys and the flowers and ran inside the house. It was filled with smoke and remnants of the fire. He shouted his wife's name but there was no response. As he entered the bedroom, he saw the burnt bodies of a woman and a child on the ashen bed. He went to check their pulse, but both his wife and his son were dead. He prostrated on the floor and started crying.

Moravid had no idea how long he sat there and cried. But suddenly he was filled with a feeling of immense rage. All he wanted to do was to kill the people who killed his beautiful family. It was obvious to him that this was Laseen's doing. Vizier must have gotten suspicious of Maravir's plans to overthrow him and like a coward, he must have sent his men to kill him. The men, assuming that Moravid must be in his house, set the house on fire. Moravid was furious. He stepped out of the house and caught one boy from the now dispersing crowd and asked, "Who did this?!" The boy trembled with fear at the look in Moravir's eyes but he stuttered and said, "Three ro..royal guards. I don't know who they were but they were wearing r..red batches on their capes." This was enough information for Moravid. Those 3 men were Laseen's most trusted and skilled soldiers. They wore red batches to show their loyalty towards Laseen. Moravid went inside the house to retrieve whatever was left. But all he could retrieve were his bow and 2 enchanted arrows. All of his other weapons had been destroyed. Moravid stepped out of the house and ran towards the castle, resolving to kill those men.

Upon reaching the castle, he went towards the soldiers' barracks. He stepped into the main hallway which then divided into 2 corridors. One on the left and one on the right. The left one he knew was filled with dangerous traps and machines that would kill anyone instantly who stepped on it. These traps had been custom made by Laseen in order to torture the people he disliked. As he silently walked through the

corridor, he heard voices from the right-side corridor. He stopped and tried to listen to those voices. He recognized the voices of the three men who had killed his family. They were laughing and celebrating their victory. They were evil men just like Laseen who took pleasure from the suffering of innocent people. Moravid clenched his fist in anger and instead tried to focus and get into his assassin killing mode. He quietly listened to the voices and tried to determine the location of the soldiers.

Soon Moravid concluded that, if he considered the point where the main hallway divided into left and right corridors as the 0 point on an axis, then the soldiers were standing on +1, +3, and +5 points. He looked into his quiver and found the 2 enchanted arrows he had managed to retrieve from his burnt house. The enchanted arrow had a special power. Along with killing the man it struck, the arrow also shifted people standing close to the person by 2 spaces. Now, he had only 2 arrows and 3 people to kill. He closed his eyes and went through all the possibilities and opened his eyes when he was sure of his plans.

Moravid stealthily knocked the first arrow in his bow. He took a deep breath and calmed himself. He had to be very fast and very focused in order to kill the three men. He concentrated on the sounds of the soldiers and aimed towards the soldier standing at +3. He released the arrow and ducked back into the main corridor as fast as he could. The arrow struck the soldier at +3 instantly killing him. And due to the impact, the soldier at +5 was thrown to +7 and the soldier at +1 flew at -1. Since being on -1 meant that the soldier was thrown to the left corridor, he fell into the traps and screamed as he was crushed by the traps. This just left with the soldier at +7 who was still recovering from the shock of what had happened. But Moravid was already ready with his second and last arrow knocked and aimed at the last man standing. He realized the arrow and the man at +7 was killed instantly.

Moravid closed his eyes and recited a small prayer for the peace of his son and wife's souls. He then heard the sound of the other soldiers coming towards him. Moravid couldn't kill all the soldiers because he was out of weapons and also, many of the soldiers were his friends who had the same beliefs as him. As Moravid was escaping the barracks, he saw one of his soldier friends. He told him about everything that had happened. About how Laseen had murdered his family and how Moravid had killed the 3 soldiers. Thus, Moravid's friends helped him escape the castle unharmed.

Moravid ran through the forest in order to escape and found an abandoned cave. He hid inside the cave until the footsteps of the soldiers searching to kill him went quiet. Moravid resolved to stay hidden and return when he was ready and kill Laseen. He stayed hidden inside his cave and only came out when he needed supplies.

-CHAPTER EIGHT-

Cryptography Unleashed

Carak had turned very sad upon hearing Artemus' stories, and further offered him his sympathies, and promised to help him in his mission until its very end. Their friendship had deepened a lot in the past few days. Finally, after gathering the support of two large villages, Artemus bids them farewell and sets off for a journey to the nearby village Kerman, to further expand his army. Carak also stays behind to train the villagers, and to gather the best armour in Zetopia, promising Artemus that they would meet soon. Artemus' exhaustive journey across the fuscous-brown barren desert, bearing the cankerous heat and the cantankerous cold was heart-haunting. After three days and three nights of harsh weather and hunger, he finally reaches Kerman and takes shelter from an inn. After taming his growling stomach with sumptuous dinner, he goes back to his room. Thinking about the plans, strategies, and fighting the intruding dark memories of his past, he falls asleep. Waking up, he realizes he needs to be in touch with Carak, and establish the flow of information. He takes a small tour of Kerman, keeping the hope of recruiting a trustworthy comrade with which he can gain an army and earn enough power to overthrow the treacherous king.

After staying in the village and interacting with the villagers, he learns about Aegeus, a hero who keeps the village in peace and protecting it from the treacherous, cunning government officers. He was the hope of the people who are living peacefully who once were in rags, and tormented by the kings' men.

He finally meets Aegeus, the huge body with a pompous chest, sturdy calves, he was built like an engine. Under the gleam of the sun rays, with the sparkling smile greets him.

“Greetings Aegeus, the hero of the village, I have heard that you want to bring a revolution to this kingdom and bring forth peace and prosperity to the people. I, Artemus , the son of Daseem Ultor want to dethrone the greedy, evil king and end the suffering of the kingdom and its people and attain them peace and prosperity. You could join us, and help us achieve our goal.”

“Hmph, what makes you think that you can trust me?, tell me one thing: What exactly is a king ?”

“Haha, the people of this village believe in you, all their hopes lie within you. Even if you were to betray me, I would die gladly without regrets, believing that the kingdom and it's people definitely will attain peace and property with you around. You aren't such a fool of a human to leave the suffering of the people astray. A king is both, the head of the people and the people's slave. For the survival and welfare of the kingdom, they gladly would put themselves in any kind of trouble. They develop their people and place them where they best fit. They could take definite actions against its own people, for their welfare and protection. That's a king, all for the kingdom and it's prosperity.”

Moved by Artemus' words, Aegeus falls on his knees and pledges, “Then I , Aegeus, will dedicate my blood and all that I am to you,

Artemus. I will protect this kingdom and it's people that you support, I will work for you and decimate the people who are a threat to the kingdom and it's prosperity".

Meanwhile, something that the Artemus had feared had already conspired. The information that someone was gathering an army, and rumours that he was of Royal Blood had started to circulate. Hearing these rumours, Kaleen, who was a local bandit decided to find this person, for he knew that the King would give him a great reward for catching a treacherous citizen. He heard some rumours that Artemus was last seen in Zetopia and he had some rebellious preparation going on in that village. He lets out a burst of evil laughter, the only path to Zetopia goes through the very forest in which Kaleen and his men have their hideout. He and his men start threatening every messenger passing this way to reveal their scrolls, in an attempt to find the true location of Artemus.

Upon learning this Carak sends his updates to Artemus by sending a scroll with a low-level encryption message.

*Url Pw,
Ubcrlbb ner qbvat svar.
Nyy gur zrffratref va bbe ivyyntz pbzr naq tb ivn gur sberfg cngu, ercbegvat gur fpebyy
pbagragf gb Xnyrra ba orvat guerngrarq. Ur zvtugfbba rzcyl n pelcgbtencure gbb, ol
juvpu ybj-yriry rapelcgvbaf yvxr guvf jba'g or urycshy nalzber.*

Upon receiving the message, being as smart as he is Artemus smiles and says, "As expected of you, Carak.". Seeing Aegeus' confused face, he says, "This is *Caesar's Cipher*, it's one of the substitution ciphers. Carak must have sensed some trouble and must have encrypted it. Caesar's Cipher encryption is done by shifting the letters of message by fixed number of positions. For example for a right shift of 3, A becomes

D, B becomes E and so on... In this case, it looks like it is 13.” Artemus starts deciphering it, and voila:

Hey Artemus,

Hope you are doing fine.

All the messengers in our village come and go via the forest path, reporting the scroll contents to Kaleen on being threatened. He might soon employ a cryptographer too, by which low-level encryptions like this won't be helpful anymore.

The information updates are highly sensitive and is top-secret, Artemus wants his communication with Carak as secure as possible, but all the messengers are unreliable. So, Artemus starts thinking about better ways of encryption. Pop!! An idea struck him, and he decided to use RSA encryption. He immediately starts writing about RSA encryption and sends it to Carak in Caesar Cipher.

The deciphered-letter thus read :

Hey Carak,

Let's play a small game,

There's a bunch of identical locks. They all have one opening key for it. The lock locks itself once you close it. Say you have a friend with whom you want to share secrets.

Using the lock's blueprint, he makes a lock, dumps the secret into a box, and locks the box with that particular lock. After receiving the box, you open it with the opening key and receive the secret safe and sound.

Simple right?

It's nothing but RSA encryption.

So, all you have to do is pick two large prime numbers p, q .

Let the message after converting it to a number form using a suitable algorithm be m .

Let their product be n .

Find the Euler's totient of n say ϕ . In this case it's $\phi = (p-1) \cdot (q-1)$.

Choose any number between 1 and ϕ as e .

This will be your encryption key, aka the "lock blueprint", which you give to your friends.

Now find a number d between 1 and ϕ , such that $(d \cdot e) \bmod \phi = 1$.

This d is your decryption key, aka the "key".

Say my keys are d_1 (secret), and the lock blueprint is e_1 .

Your key is d_2 (secret), and the lock blueprint is e_2 .

I will write a message, convert it into a number m by a suitable algorithm and lock it in the box with your lock e_2 by

$$c = (m^{e_2}) \bmod n;$$

When this box arrives, you simply can unlock it with your secret opening key d_2 by:

$$m = (c^{d_2}) \bmod n$$

And vice-versa with e_1 and d_1 for me

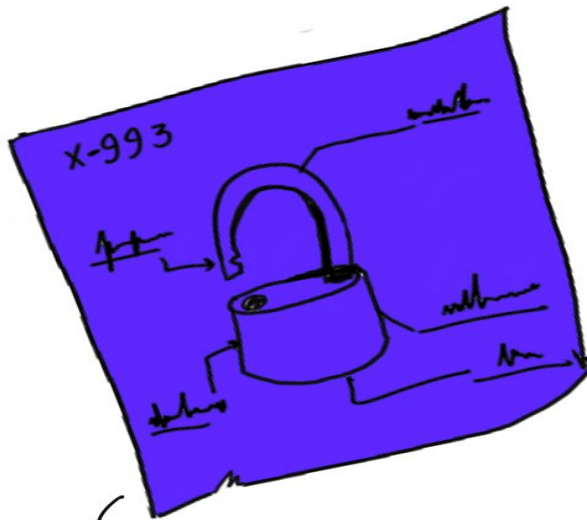
As long as p, q are large enough, it's difficult for people to make the key from the lock's blueprint.

Here we go, let's communicate using this technique from now on.

After passing two messages with each other Artemus and Carak establish RSA encryption, before Kaleen could even get a cryptographer. Upon learning that from his cryptographer that some messages were in RSA, Kaleen is also explained about RSA. An evil grin split on Kaleen's face, for he knew something like this would happen, and he had made duplicates of all messages till the cryptographer came. After receiving the copies from Kaleen, the cryptographer identifies Carak's and Artemus' messages and he notes down e_1 , e_2 from the first two deciphered messages. One day he writes a message to Artemus, giving him false information and luring him to a trap that he just setup, pretending to be

Carak and encrypting it in RSA with e_1 and sends it to Artemus without suspicion. Unfortunately, here's the catch, RSA is designed for many to one encryption. People can make copies of the lock's blueprint and send messages to Artemus too. Without proper signatures, we can't know from whom the messages are coming from. What Artemus needs currently is one-to-one encryption. After receiving and decrypting the message, Artemus realizes something is off. Maybe he got tricked, he realizes that even if someone deciphered the caesar ciphered messages and knew e_1, e_2 he may not be able to read the messages but can write them as if he were Carak impersonating him and luring him into a trap.

With a confident smile spread across his face, Artemus gets confident enough about a better encrypted messaging technique..

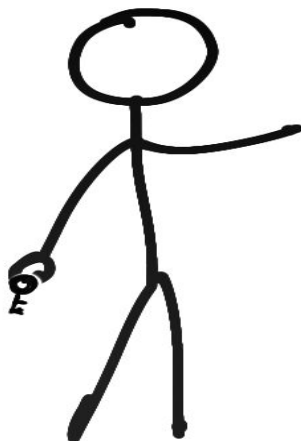


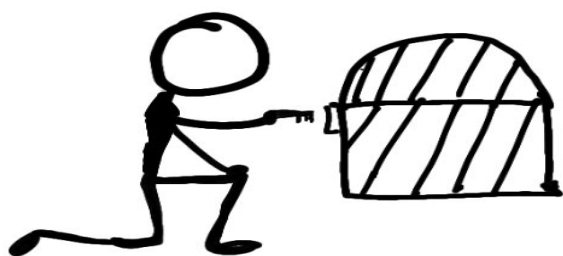
Lock blueprint from which anyone can make the lock, but not the key.



The lock, which locks itself when closed.

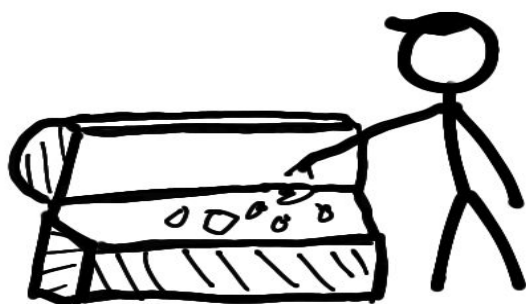
Cj keeps the opening key and sends the lock blueprint.





Cj opens the box
with his opening key.

He gets the
'secret' stuff
and is happy.



Guddu stores the
secret stuff in a
box.



He locks it up by the
with the lock made from the
blueprint.

He then sends it
to Cj keeping the
blueprint



-CHAPTER NINE-

The Better Encryption

“**D**iffie-Hellman is fit for this job, being a one to one to communication encryption we can communicate without worrying about signatures or any pretenders”, Artemus mumbled to himself, as he penned down another RSA-encrypted message for Carak.

The deciphered-letter thus read:

Hey Carak,

Something fishy is going on. Without proper signatures, there's a flaw in our encryption, i.e. Anyone can send me the messages of the same encryption pretending to be you. They easily misguide us with false information.

Please forget whatever information is received in the past letters, I came across a better encryption algorithm - Diffie-Hellman encryption.

It is one-to-one encryption, unlike the previous one which was many-to-one. So we need not worry about imposters feeding us with false information.

Just imagine this:

We will create a common secret chemical solution known only to both of us and no one else.

First, we choose a common ingredient called 'generating ingredient', G and another secret ingredient of our own, each separately. Let's take a number, p .

Say, mine is A and your's B. I make a solution, by mixing 'G' and my secret ingredient 'A' in p:1 ratio. You do the same, make a solution by mixing 'G' and your secret ingredient 'B' in p:1 ratio. The mixing is inseparable. I send this sample to you, and you send the sample to me. After receiving the solution we mix the received sample with our secret ingredient in p+1:1 ratio. We both end up having a common secret solution which is a mixture of G, A, B in p:1:1 ratio.

We can encrypt and decrypt the messages by dipping them into this common secret solution and chanting a particular spell.

Suppose if an enemy managed to get the samples from the messenger he will get 2 different solutions of G-A , G-B of p:1 ratio each, from which he isn't able to make our secret solution unless he is able to separate the liquids from the solution which he can't.

Sounds simple right? It's nothing but the Diffie-Hellman algorithm.

Diffie-Hellman is based on elements of a Field finite F_p , where p is a large prime.

We can create a subgroup of F_p , $g : H = \{g, g^2, g^3, g^4 \dots\}$, which comes out to be finite.

'g' is called the generator of F_p if $g:H = F_p$ i.e We can generate the whole F_p by raising the powers of g.

We decide F_p by choosing a suitable large prime p and we get our generator g aka the 'generating ingredient'. We decide our secret numbers aka our 'secret ingredients', which is less than p. Say mine's a and yours is b.

I will mix my solution from g, resulting in $g^a \bmod p$ and will send it to you.

Similarly you will make the solution $g^b \bmod p$ and will send it.

After receiving the samples, we will mix it with our secret ingredient as

(received-sample)^{secret} mod p . We both end up getting with our common secret i.e $g^{a.b} \bmod p$. This common secret $g^{a.b} \bmod p$ obtained from Diffie-Hellman can be used as a superkey for us in symmetric encryption-decryption techniques between us.

Here, the better selection of p , a , b , the more difficult it is to separate the sample mixture. Generally a large prime p , where $(p-1)/2$ is also a prime is a good selection. Large values of a , b are preferred and should be less than p .

From here on let's communicate by adding this encryption.

After exchanging the parameters, they were able to establish Diffie-Hellman encrypted communication and were able to communicate safely.

“I have to create a bigger army, I still need the support of many heroic organizations and gain their trust. I need to search for such organizations. Hereby, I entrust you to handle the updates of Zetopia and also take care of Kerman and start recruiting potential candidates and start weaponry production for the upcoming revolution. I will be messaging and will be visiting here regularly.”, saying this and leaving Aegeus incharge, Artemus set off on his journey.

Kaleen on the other hand realized that Artemus didn't fall for his trap and might have gotten alert about him. However, from few more spies, he got to know that the rumoured prince was in Kerman. He started thinking about his next plans, “Till now, I didn't stop the messaging between them and let it happen smoothly so that I could stay low and prevent any alertness about my presence. But they figured it out at the start itself. The fake message luring him into the trap also didn't work. Also, it is too risky to attack them head-on. But, now that I know that he is in Kerman, with help of the officials' support I could still capture him and get some of the rewards. It's worth the risk.” He contacts the officials and shares all the information on him. Kaleen, the officials along with their men and gathered soldiers to check in with their weaponry getting ready for the raid-attack.

After recruiting yet few other organizations, with a tiresome face, Artemus returns back to Kerman. However, to his utter horror, everything is broken, stone-pelted shops and houses, people lying injured here and there, children crying. There are a bunch of people gathered near the street pole. Confused and scared of what's happening, Artemus rushes to the crowded spot. Covered in blood, with torn clothes, a swollen face, deformed body, ripped off nails, lied there, unconscious Aegeus, smiling even in such pain. On the wall beside, huge words in blood were written, "Artemus, surrender yourself by the fifth full moon of the year. You may or may not return and see this, and irrespective of that if you don't do as said, there won't be a single soul left in this village."

Feeling devastated Artemus let out a cry of anger and sorrow, vowing to take revenge. He carries Aegeus in his arms and runs as fast he can to the infirmary. Upon enquiring, an old man with his eyes full of tears replies, "Kaleen and his men came on horses, pelting our homes and shops with stones, he started yelling out your name. Right then, Aegeus came and confronted him, and Aegeus and his men beat them black and blue. Just when Kaleen was getting beaten mercilessly, the government officials and soldiers attacked him. Aegeus and his men were now powerless. Aegeus got dragged to the market place and was tied up to the lamppost, and Kaleen started yelling again for an audience, asking your whereabouts. Except for Aegeus none of knew where you were exactly. He started beating Aegeus to a pulp and tortured him gruesomely, asking continuously about you. Meanwhile, Kaleen's men came and reported that they searched the entire village and you were nowhere to be found. Even in torture and pain, his deformed face covered in a pool of blood, Aegeus started laughing and replied 'Isn't that obvious Kaleen, he isn't a coward like you to be hiding in these situations.' And then Kaleen started torturing him mercilessly, without a bit of fear in his eyes, he kept smiling without uttering a single word, till he fell unconscious. Then with blood flowing from Aegeus, Kaleen

wrote something on the wall. He warned us that we will all be dead if you don't surrender yourself to them."

"Then he leaves me with no choice", Artemus immediately sends a message telling Carak, Straff and all others recruited to pack up their weaponry and assemble in Kerman. Artemus then pays a visit to Aegeus and checks on him. He is quite recovered.

"It's nice seeing you, Artemus. Don't worry about the warning, I can manage them, or we could just relocate our village. You just stay as far as possible from this place, it's dangerous."

"Hahaha, no no, not anymore, I've been running away my entire life, since the day I was born. Not anymore..... We have an army now. I've called all the rebel organizations to assemble here. however, such a large movement will surely be noticed by the King, and he will definitely come into action. We have to prepare for the war on the expected day."

As expected by Artemus, the officials get intelligence of the mass gathering happening. "This matter can no longer be handled by us, it is not just a small fight anymore. Let the king be notified of the upcoming war as soon as possible." Upon coming to know that the battle that he had longed for so long, was about to happen soon, Artemus got pumped with excitement, as his thirst to kill the Vizier who wronged his family seventeen years ago grew even more.....

-CHAPTER TEN-

The Battle Begins

As the preparations for the war went on in full swing, Artemus knew that they would need immense resources to combat the incoming armies. However, with the limited number of horses and men that he had, Artemus simply didn't have the time to make multiple trips to the Zetopia. However, he realised that such trips could be made in time, only if he would take the path shorter than the one they earlier took to reach the village. Artemus took a map and traced out all the nearby cities, and the distance of the paths between them. Upon tracing it out, he realised that what lay in front of him was in fact... A Tree! Now, he needed to first visit Zetopia to collect armour, then Barada to collect weapons, and then to finally to Shaki, known for its enchanting skills to enchant the armour and the weapons. Artemus had to find the shortest path from Kerman to Shaki, while first visiting Zetopia and Barada. Artemus smirked as this was a problem well known, and familiar to him. He could simply use the *Dijkstra Algorithm* between Kerman and Zetopia, Zetopia and Barada, Barada and Shaki, and to finally return from Shaki to Kerman.

Now, he marks the distance between Kerman and all the other villages on the map as Infinity, to denote that he hasn't visited those cities yet. Now, he selects the CurVil as the current village, and the

distance to the current village as 0. Now, he updates the distance from the current village to every other unvisited village that is directly connected to it as the sum of the distance between the current city and that city summed with the distance of the current city. Now, he relabels the distance to that node as this obtained sum if this sum is lesser than the value that was previously allotted to that node, otherwise it remains unchanged. Thus, we are relabelling the path to the visitable villages if it is lesser than the path that already reaches them, and marking the node that we reach that path from. Now, he marks the current village as visited, and moves on to the village that is unvisited and has the minimum distance label from the current village.

He continues this process until he marks the village of Zetopia as visited. Now, he traces back the cities that he used to find the minimum distance till Zetopia, and thus he has successfully obtained the shortest path between the two villages.

Since he needs to independently find the minimum distance between the pair of villages, he repeats this process for all the pairs, and obtains the shortest possible path. This did great wonders to them, as they were able to gather a large number of magic scrolls, cannons, traps, swords, and much more to better prepare for the impending danger....

As Artemus stood in the deserted land, that would soon become a battlefield, he knew that this was the moment he had been waiting for, this was the only chance he had... The silence in the land was broken, as he suddenly heard the soare sound of the arrival of the King's battalion. However, Artemus was not afraid.... From the numerous villages that he had visited, he had assembled a large number of tools and weaponry, and also managed to gather enough troops to defeat the small section of the King's army that had come there that day. Suddenly, one soldier of Artemus' army shouted, "I see them approaching.... They should be here soon."

And within a few minutes, they saw the Royal Army in front of them. However, the numbers in Artemus' army seemed to be pale in front of the Royal Army. Despite this, Artemus was confident in the men that he had gathered. His army stood in the formation that he, Aegeus and Carak had strategized over for 2 days. A large number of Archers stood atop a large platform, the cavalry stood on their shining horses, the infantry in their armour held their brilliant swords, as they shouted, "Glory to the Ultor."

Laseen's army stood before them. Apart from the Cavalry and infantry, it was also armed with the most accomplished State Alchemists and Magicians. Artemus knew that they would be the hardest block in their path to victory. As Laseen's army came running forward, shouting "In the name of the Kingdom of Malazan!!", the Archers who had hid behind the platform started shooting arrows on the enemy army. Artemus watched with a smirk on his face as he saw the running bodies turn into corpses. However, soon the enemy soldiers realised this enemy force, and held their shields up while running towards their enemy.

When the enemy army came close enough that using Archers could hurt their own, Artemus ordered for the activation of a hidden trench that he had taken his time to set up, and took advantage of the knowledge of the terrain they were fighting on. Laseen, sitting on top of the platform in his camp, as well as the Generals stood in disbelief as they saw a large portion of their army fall into the large pits right in front of their eyes! Artemus smiled as he could see the advantage that was held by Laseen fall right in front of his eyes. It was at this moment, that he shouted at the top of his lungs, "Treacherous Vizier! I am the son of Daseem Ultor and I have returned, to punish you for the treachery that you committed against my father seventeen years ago."

Laseen's face suddenly grew pale. He only knew that there was some rebellion against him being organised, as was reported by Kaleen,

who worked under him. However, this was the last thing that he ever expected to see with his own eyes! After giving the call for vengeance, the Prince, who considered his life equal to that of the rest of his army, jumped to rush towards the now unprotected and exposed Vizier's battalion. This is the moment, when the general of Vizier's army shouted, "Unleash the Chimeras!!" Hearing this statement, within the small frame of time, the Prince's army froze. They had conflicting thoughts in their minds - Chimeras were something that was considered mythical. The fire breathing creatures, with the body of a lion, the head of a goat, the tail of a snake's body, indeed stood in front of them, summoned by the State Alchemists, who had unlocked the art to summon them, and these fearsome creatures ran towards the Prince with fierce growls.

Artemus ordered his army to fire cannons at the beasts. However, they were simply blast away by the breath of fire that the demons released. While Artemus was determined not to lose hope, his other comrades' faces had turned white with fear. These Chimeras were known to be most ferocious, and the longer the horns on the goat's head, the more powerful Chimera it was known to be. Artemus knew that it would take a lot of magical power to kill the beasts.

With his magical powers, Artemus could see the strength that every creature possessed - that too in the form of a number! However, he also knew that Chimera had regeneration abilities, and that its health, which was initially max , could regenerate at the rate of reg per second. He also had magical scrolls, which each could do a damage of $dmgi$ to the health of the Chimera. However, each scroll could be used only once on a living being, and only one second after a scroll is used, and only if the percentage of its health is lesser than pow_i

Thus, every time Artemus would use a scroll to hit a Chimera, and the Chimera would regenerate reg amount of health. Now, Artemus would use another scroll on him, if it is possible to use it. Artemus

knows that it is possible that he might not even be able to kill some of the monsters. However, he has to be GREEDY in choosing the scrolls, and devises an algorithm to deal maximum damage to the Chimeras. He would use the scroll that can deal the maximum damage out of the ones that are usable, i.e. have value greater than percentage of health of the Chimera, since more the damage, lesser is the health of the Chimera after the attack, and more the number of scrolls that become accessible for further use.

Using this strategy, Artemus was able to defeat a large number of Chimeras. As Artemus was marching forward, slaying the monsters that stood in his path, his best friend Carak stood by his side, slaying the demons along with him. They both had indeed thought of the same algorithm to attack the enemy. However, Artemus watched in horror as he saw Carak attack a Chimera with the largest of all horns, and the scrolls that Carak had were not powerful enough to kill him. When Carak exhausted his scrolls, Artemus watched in horror as the Chimera regenerated his health, and took a large breath to unleash his fire attack on Carak. Artemus screamed, “Noooo”, but it was too late. Carak, with only his sword as the strongest weapon, swung the sword at the mighty lion head of the Chimera, but instead of disappearing in thin air, it unleashed the attack it was preparing at Carak.

In that millisecond, Artemus saw Carak look at him, tears in his eyes, as Artemus recognised the words that he spoke, “It’s ok”, before the fire from the Chimera burnt down Carak’s body. It was at this sight that Artemus lost his mind. He had spent so many years mourning his loss, and another was added right in front of his eyes. He rushed to recover Carak’s burnt body, and he blew into a fit of rage. He didn’t care anymore about the algorithm, about the kingdom, about anything..... He just wanted to kill those who had caused friend’s body to be burnt to a crisp. With fire being sprayed everywhere by the murderous Chimeas, Artemus kept screaming in sorrow... the screams that went unheard.



-CHAPTER ELEVEN-

The Crippling Loss

Artemus was desperate to find any flickers of life or hope left for his dearest comrade. Laying in his arms with a graceful smile, Artemus' best friend is lost forever and he is desperate for revenge. Unable to bear his emotions, Artemus yelled out a cry of vengeance, swearing to kill every enemy on the battlefield which was followed by cold silence broken only by the red misty breeze howling past by the ears. The switch in his mind went off, there was no sensation of fatigue in his limbs anymore, with a completely undefined state of mind, overflowing with revenge he goes on a rampage mercilessly slaughtering every enemy on his way, he was going for the king's head.

“It is too dangerous, he is outnumbered. I need to stop him at any cost and help him regain his senses before it is too late.” sprinting up to the nearest horse which was running haywire amidst the war, taking the reins of it, Aegeus finally manages to mount it. He races towards Artemus and battles the enemies simultaneously. He grabs him by the armor and pulls him up. “Leave me alone, Aegeus. That wicked Laseen doesn't deserve to live. He first snatched away my family, and now my best friend who was so dear to me. Nothing doesn't matter anymore other than killing him”

“No no, you are wrong. Moreover, it’s too risky for you to fight alone with the king’s protection squad. We need to have a proper strategy before we attack recklessly.”, Aegeus picks up the pace and swiftly rides towards their base.

“Aaaargh!!! How dare you disobey me, let me go right now!!!”, yells Artemus maddened with rage and sorrow.

Coughing up blood and with tearful eyes, he smiles and replies “What is a king, huh, all for the sake of the kingdom and it’s prosperity. Carak’s soul won’t rest in peace until the people of this kingdom live in peace. Is this what he wanted to see? A psychotic slayer slaughtering people and seeking his own selfish revenge?

Artemus starts to regain his senses, his vision becomes clear, Aegeus was injured severely, he could again hear the cries of the fighting men, screams of the injured and the thunder of steel clashing steel, the throbbing pain in his limbs returned. “Oh no! What have I done! I have put everyone at a huge risk. You barely made it out alive, risking your life in rescuing me”, exclaims Artemus in sorrow and regret.

Returning to the base, Artemus carries Aegeus to the medics immediately. After getting minimal first-aid, Aegeus stands with all his might and says, “These injuries are nothing, I still have a war going on to fight.” Comforting Artemus he says “Let us not lose hope yet.”

The war is still raging on, the king sends the next wave of soldiers, filled with vengeance and rage Artemus and Straff step up ready to take them down. Straff activates his byakugan, the ability of his eyes to notice the hp of anyone whom he can see. Being the army’s strategist, Aegeus notes down the intel on enemies given by Straff. Artemus interrupts and says, “Straff and I are planning to attack the enemies alternatively, taking on them one by one, but this is Straff’s first combat, he is quite

inexperienced, so make sure he has a chance to skip his turn, he can choose to skip utmost 'k' times. Also, he's quite sensitive, so do make sure that the least possible number of enemies die in his hands."

Looking at the data, Aegeus mumbles to himself, "There are 'n' enemy soldiers in the coming wave, their respective health points, 'hi' are noted down. Artemus' attack brings down the health by 'a' points, whereas Straff's attack brings it down by 'b' points. The enemy will die in the hands of the one whose attack brings his health to less than or equal to zero. Moreover, Straff should be made to kill as few enemies as possible. Also he can skip his attack utmost 'k' times."

With the given data Aegeus begins planning out the attack strategy, "After enough pairs of attack, the enemy will have the health of either $hi \bmod (a+b)$ if it's value is non-zero or the will have the health of $(a+b)$, say that near-death health value is 'nd', if that value is less than 'a', the enemy will die in hands of Artemus. Else, in order to avoid death in hands of Straff, he would need to skip his attack ' $LIF(nd/a) - 1$ ' times, let's store this is value be $skipno_i$. Where is $LIF(.)$ is the Lowest Integer function. But wait, he can skip only at most 'k' times. So in order to keep least deaths on Straaf's burden, we will start attacking the enemies by the increasing order of their $skipnoi$ value. Straff will skip his attacks as planned, till he is exhausted of his chances."

Feeling proud of the plan he made, Aegeus rushes to Artemus and Straff and explains to them the attack-strategy. Nodding their heads, they gear up and start attacking them. Raging a war cry, they attack them as per the strategy, the wave eventually dies out before even reaching Artemus' base.

Artemus and Straff emerge out after eliminating the current wave of soldiers. The optimal attack plan had worked out. Their small moment of victory is destroyed, the king again sends yet another wave

of enemies. But this time the king had played his trump card. Artemus and his men lookout for intel of the upcoming wave. Aegeus grabs his binoculars and observes over the hazy battlefield.

The binoculars drop down from his hands. “They are not just ordinary soldiers, it’s the top assassins of the king and their men. They are the most deadly enemies to deal with. We should be highly alert.”, cautions Aegeus to the army. He starts planning a strategy, he splits the army into squads and explains them the attack strategy. The squads start sprinting to the enemies, heading on with valor and courage, they were quite confident about gaining the victory.

Artemus and squad proceed towards the central area, “I have trained very hard, these many, I can’t just let it go waste, I need to anyhow win this battle.”, he told himself.

But all of a sudden, a thick fog started rolling in out of nowhere, it was dense and so thick that it would need a knife to cut through it. Artemus and his squad couldn’t see anything. Nonetheless, it was the assassin’s secret technique.

Artemus opens his eyes, regaining consciousness, he is wrapped up with medicinal herbs and was lying down. He saw all his followers surrounding him with eyes of hope. Pain was throbbing throughout his body. Straff explains, “ By the time we came near the central area, the fog was dulling off. We could see shadows of you fighting 3 assassins all at once. You were stabbed but still fighting with all your might. We paced forward and fought them, once we rescued you, we found you in a semi-conscious state, many of us were being killed, we had no choice but to escape from there, we have managed to cut off the trail. You have been in bed for 2 days.”

Feeling devastated and filled with regret, Artemus sits up and speaks tearfully, “I am really sorry everyone, you all were put in much deeper risk because I wasn’t strong enough. I got alert, the moment the dense fog started rolling in, we knew we were not alone, shadowy silhouettes were moving steadily towards us. And suddenly, we were being mobbed, getting stabbed by knives and swords coming out of nowhere. People were getting slaughtered like sheep before they couldn’t even expect it. I should have known, but I didn’t, that very mistake of mine cost me my men’s lives. All of us except me were dead before we knew what had happened. The fog which was white dense was now misty red from the sheer of blood that split from the massacre. They all came at me at once, I managed to block some of the attacks, my limbs weren’t moving as they were supposed to from fatigue, I could feel the adrenaline along with consciousness fading away, before I could do anything my mind was all fogged just like the red haze.”

There nothing much left, he was left with very few yet valiant warriors. He walks to the memorial of the martyred soldiers and vows “I will not let your death go in vain, I will definitely overthrow the King and bring prosperity to the kingdom”. Artemus and his men gather at the funeral to say their prayers to Carak and the other brave soldiers who gave their lives for a noble cause. Along with the tears of Artemus, it begins to rain, as though Nature was trying to cool down his anger and vengeance. Aegeus lays his hand on Artemus' shoulder, promising him trust and assurance.

Filled with sorrow and vengeance, he begins to stabilize the organization. He starts to send his men to gather as much intelligence as possible to gather more and more soldiers as possible. He is advised by Aegeus to try to gain the support of Necor, the Middle-Eastern part of the Kingdom of Malazan, that was brought under subjugation by Laseen after a long war, and could provide great support to him as they were specially unhappy under the rule of Laseen.

-CHAPTER TWELVE-

The Fate of the Slave

If dread and misery could be represented in a scene, the Ottaral mines would be an appropriate description. Here the chained slaves, each having a pickaxe in hand were busy prying open the walls rich in iron. Their work was hastened at the peril of the soldiers standing behind them, each having a whip in hand in case they decided someone's speed was not enough. The scene was made more grim by the fact that there was no sky here but only rocks in every direction, with a small clearing in the middle.

For two months, Felisin had been working in this hellsworn place. She would be brought here in the morning just an hour after dawn and would mine until dusk. The beginning had been pretty tough on her. Coming from a noble family and having never performed manual labour in her entire life, she found herself to be having far less stamina than the second slowest person in her group. As such she was subjected to a heap of blows almost everyday. By the end of the first month, she was able to perform at an average speed.

Her life had turned like an eagle suddenly hit by lightning. Flying proudly high up in the sky, king of the sky, only to drop to ground to get

eaten by all who served him. In another time, these soldiers would have lashed any who dared to come close to her in the capital's streets. Noble's prerogatives. And now she was being lashed by soldiers of the same army.

Yet she sorrowfully accepted all this. She knew her sister had done this to clean the family's name and throughout her life she had been told that family's name is above all. She thought that had she been in her sister's place she would have done the same thing, but she knew that it was a lie.

More than that she knew with a certainty that escape from here would be impossible and more impossible would be to deliver any kind of vengeance to her sister. Not wanting to die with unfulfilled vengeance she had turned to the method of accepting her sister's actions as just and continuing on with her grim life.

The priest, true to his words, had stayed for two months. He would visit her everyday after dusk, waiting just near her house. He would also look over her in the mines, though he was very discreet about it. Felisin had luckily seen him once to gather this fact. At the end of the two months, he had wished her farewell then left.

Dusk was almost on and the day's work was done. The slaves were released for the day, their pickaxes taken and then unbound from chains. They were now free to go to their dingy makeshift houses, only to come back again the next day. The houses were small enough to hold no more than a single bed and a table. The part of the city in which the houses were constructed was surrounded by walls so escape was impossible. In the morning they were chained here itself and then taken to the mines.

Felisin was going to her house, just a few streets away from it.

“Felisin,” she heard someone whisper. She looked at the alley beside her. She had a few friends and the voice sounded like one of them. She entered the alley and was shocked by what she saw. Her friend’s mouth was cuffed by a man’s hand. Suddenly a knife was thrown at her from somewhere. So this was her end then. She was too slow to react, she knew and hence there was no escape. She had resigned herself to her fate when suddenly she was pushed out of nowhere. On recovering, she saw that it was none other than the priest who saved her.

The priest had expected this for a long time. The chance of Felisin’s assassination had been very high. He had watched her family from ages and knew that Felisin was by far more intelligent and beautiful than her sister. Better than her in all aspects. Travore would surely have sent assassins after her. Although Felisin thought that her bondage had been for purely reinstating her family’s name, the priest knew there was another aspect to it. In all of his visits to the family, he could clearly sense the hatred and jealousy that Travore had towards her sister. She of course did not display this in her personality, but him being a priest, he could detect more than what meets the eye.

On arriving at the minetown half a score of soldiers had seen him at the gate along with Felisin. When no attacks happened during the first two months and even the soldiers didn’t misbehave with her beyond work, it was clear that whatever attackers Travore had sent would wait until his departure, clearly aware of his priestly powers. Hence he had created a ruse of leaving the minetown for good, whereas in reality he had stayed incognito within the city. He had been following Felisin stealthily and from a distance and his timely push had saved her.

He looked at the attackers. They were two in number. Although they had no magical powers, yet they were full of lethal and deadly weapons. Travore had clearly not thought about external powers

protecting Felisin. Lucky for him and her, the priest's magical powers would just be enough to make the two assassin's unconscious. And so he began praying and concentrating on his God so as to gather sufficient power.

“My dear child Hood, you are one of my most devout subjects. And yet you haven't made contact in two months. You know the rules as well as I. So you will have to solve a algorithmic problem to prove you are still as sharp and devout as before.” He heard his God's voice call in his mind.

“O great one, I am ready to face any tests”. Hood thought in reply. “Very well then. Here's your problem. You are given two strings A and B. For any two strings C and D we define their similarity score $S(C,D)$ as $4 \cdot \text{LCS}(C,D) - |C| - |D|$ where $\text{LCS}(C,D)$ denotes the length of the Longest Common Subsequence of strings C and D. Find the maximal similarity score over all pairs of substrings of A and B. More formally, find out the maximal $S(C,D)$ over all pairs (C,D), where C is some substring of A, and D is some substring of B.”

The priest thought about it for a little while. He had seen such a problem before. It was similar to the problem of calculating *Longest Common Subsequence* in two strings. Thinking along those lines, he finally came up with a solution and spoke mentally to his God thus:

“Let $DP[i][j]$ be the maximum similarity score if we end the first substring with $A[i]$ and the second substring with $B[j]$. We will also allow the corresponding most similar string to be empty so that $DP[i][j]$ is always at least 0.

It turns out that the fact we need to search for substrings of our words is not a big problem, because we can think of extending the previous ones. In fact, we have just two possibilities:

In the first case, let us consider that $A[i]$ and $B[j]$ are the same letters. In this case, we say that $DP[i][j] = \max(DP[i][j], DP[i-1][j-1] + 2)$ as the new letter will increase the LCS by 1, but both of the strings increase by one in length, so the total gain is $4 - 1 - 1 = 2$.

In every case, we can refer to $DP[i][j-1]$ or $DP[i-1][j]$ to extend one of the previous substrings, but not the LCS, so: $DP[i][j] = \max(DP[i-1][j], DP[i][j-1]) + 1$.

An inquisitive soul may wonder why it doesn't hurt to always apply case 2 in calculations, so clearing the doubts, it's important to informally notice that we never get a greater LCS this way so wrong calculations only lead to the worse score, and that our code will always find a sequence of transitions which finds the true LCS as well.

This gives us a really short $O(n \cdot m)$ solution.”

“Very well I am impressed. I shall grant you power for this occasion.”

Then the priest felt a surge of energy within him. He concentrated it and directed itself towards the assassins. Before they could react a wave of energy swept over them and they were now in deep slumber.

After confirming that they were actually asleep, he strode towards Felisin. She was clearly still in shock.

“Why would anyone try to assassinate me? I am already at the worst point of my life.” Felisin blurted out.

“Felisin, I think I will now have to tell you the truth. Your sister was always jealous of you and despised you more than anyone else. It wasn't apparent in her behavior but I have some priestly powers which allowed me to observe so. And clearly you were better than her in every aspect so the jealousy was forthcoming. She sent the assassins so that she could finally get rid of you for good.”

On hearing this Felisin was shaken to the core. If making her a slave wasn't enough, she further tried to kill him. She could no longer handle it.

“I, Felisin of House Paran, swear vengeance on my sister.” she shouted loudly. The hatred towards her sister had started building.

-CHAPTER THIRTEEN-

The New Allies

Necor was once a peaceful island in the middle eastern part of the kingdom of Malazan. It was an island with skilled warriors and craftsmen. Under the rule of the late King of Malazan, Necor was once an independent land and the people of Necor lived a happy and cheerful life. But under Laseen's rule, he subjugated the island, and had amended Necor's laws and people started suffering under his rule."

Learning about Necor and its amazing history of great warriors, Artemus with some of his men, decide to go there and earn the people's support. The journey consists of a trip through the desert till the seashore, and they have to go through the sea to reach Necor. They get prepared and pack their sufficient needs as they were ready to set off for Necor.

To first cross the desert, they hired a camel caravan. The distance to the seashore is n km. There is a town after every one kilometer, i.e there is a town at every integer point. There may be an inn in a town. The rider charges them with a reasonable price, the more the camels get tired, the more the fare. He charges a_i for covering i^{th} kilometer after taking rest (a_i increases with i). To make sure they carry enough money

before starting their journey, Artemus tells Aegeus to calculate the expected amount of travel fare.

“None of us don’t know which towns have inns, so totally there are 2^{n-1} possibilities of distribution of inns. The total expected fare is nothing but the sum of expected fare at each kilometer, by the laws of linearity of expectation. Let total expected fare be E and expected fare for i^{th} kilometer be e_i .

Then $e_i = (a_1/2^1) + (a_2/2^2) + (a_3/2^3) + \dots + (a_k/2^k) + \dots + (a_{i-1}/2^{i-1}) + (a_i/2^{i-1})$ for every $i > 1$.

This is because for the k^{th} kilometer charge to be a_k there is only one possibility out of 2^k distributions of inns from town at ‘ $i-k$ ’ km to town at ‘ $i-1$ ’ km.

And for the last term, there is only one possibility out of 2^{i-1} distributions because the starting is already a rest point.

As for $i = 1$, $e_i = a_i$, since it’s the only possibility.

Hmm, I can save time in calculations by rewriting the above equation as $e_{i+1} = e_i - (a_i/2^i) + (a_{i+1}/2^i)$.

After calculating e_i and adding them up, I will get E .”,

Thinking so, Aegeus calculates the expected value of travel fare and makes sure they carry sufficient money with them.

After 4 days and 4 nights, they finally arrive at the seashore. Bidding farewell to the caravan. They arrive at the dock to board a ship to Necor.

Artemus and his men finally reach Necor. They couldn’t believe their eyes, it was such a beautiful island. The sea was sparkling and

reflecting the full-moon lit sky. Bidding farewell to the crew, they get off the ship and walk along the seashore. The palms and other tropical plants bowing over the warm and transparent water glowing in bluish-green bioluminescence under the twinkling stars, the soft golden sand scratching under the feet, no words were sufficient to describe the beauty of the island. It was like heaven on Earth.

After spending some time on the beautiful beach, they leave for the city in search of an inn. Finally, after finding an inn after enough searching, they get into their rooms and go to sleep.

Artemus wasn't getting sleep, and as too many thoughts were intruding his mind, he decided to take a stroll and calm himself. All of a sudden a bunch of young masked men run past him, carrying heavy bags with them. He just ignores them and tries to relax his mind. Then panting out of breath, a few guards come along the same way. Mistaking Artemus as one of the masked thieves, they start shouting, "Thief, thief. He is one of the robbers who robbed the city mayor. Many major city documents are missing. Catch him!!!". Even the city sirens start to ring.

Artemus tries to explain himself, "Umm, I am not the one..." but finds himself being charged with spears by the guards. He started running to escape their fatal attacks. "Psch, they won't even allow me to explain my innocence. I have no intention of fighting them nor getting myself hurt. Hmmm, maybe I will just outrun them, once they are out of breath, I can explain everything peacefully.", he said to himself.

But things didn't turn out as expected. The people of Necor were very loyal and patriotic to their city. Hearing the siren, most of them leave their homes with whatever weapon they could find, spades, sticks, torches ..etc. to capture the criminals. They wouldn't let anyone steal the important things of their city just like that.

Artemus finds himself sunken into a very deep trouble. Torches, spades, spears are thrown at him continuously. He runs as fast as he can. He reached a dead-end, and was completely surrounded by the citizens and the guards. They steadily approached him with spears and spades pointing towards him, having no intention of listening to him except capturing him alive and torturing the truth out of him.

Artemus instinctively looks around to find something to defend himself with, and suddenly something caught his eye. Gleaming in the moonlight, he finds a magnificent sword embedded in polished marble stone beside him. He pulls it and puts on a defence stance. “Yaaahhhh!!, please stop it, I am not a thief. I am just a visitor to this city on an important work. I can prove it you.”

Everyone was shocked in disbelief, there was a sudden burst of murmuring, Artemus was surprised by their reaction. “What is this all of a sudden? Till now they were all attacking me, and suddenly they are looking bewildered. Wait, did they recognize my true identity? No no, it’s not possible.”, thought Artemus, trying to figure out what was happening.

“No he isn’t guilty of the crime. He is innocent. We have caught the thieves. The documents are now safe and sound.”, came a voice from behind. It was one of the guards who had captured the thieves, who were now tied up. Grinning with his accomplishment, he comes forward to calm down the people, but instead, he too gets shocked in disbelief.

The Mayor rushes to the spot, seeing Artemus with the sword, he drops to his knees, Artemus doesn’t understand what was going on. Seeing their mayor, everyone falls to their knees and bow to him.

-CHAPTER FOURTEEN-

Necor's Revolution

The mayor asks him with tears of joy “Who are you, oh worthy one? Only the saviour of Necor and the rightful owner of the sword who is just and destined to bring peace and prosperity to the whole kingdom can take the Holy Kelanved Sword.”

Hearing these Artemus felt the gush of his royal blood flowing through him. Rising the sword high in the air, Artemus declares, “I am Artemus, The sole heir to the throne, son of the fallen king Daseem Ultor. I have taken an oath to end this tyranny rule and bring justice, peace and prosperity to the kingdom”. Everyone's stance becomes erect with increased respect.

Gently standing up, the mayor replies, “Oh I see, 26 years ago the only daughter our king, the ever-beautiful princess of our nation got married to Daseem Ultor, the King of Malazan. After which, his Majesty Daseem Ultor promised to keep Necro as an independent nation. After a few years, with the death of the King, the newly crowned king Laseen came after us waging a war. His Majesty Durhang Ultor fought with all his might, trying his best to stop their filthy hands from snatching away our nation. Before breathing his last, he struck his sword here declaring

that only the saviour of the nation will be able to take out the sword, and he shall be the true and rightful owner of the sword who shall bring prosperity to the nation.”

The next morning, upon being advised by the city mayor, everyone in the city was told to gather at the market square. The mayor announces, “ We have waited for decades for our saviour to arrive and release us from the tyranny and this unjust rule. However, the wait is finally over!! Artemus, do you accept to lead the people of Necor with justice and prosperity .”

Lifting the magnificent Kelanved Sword high up in the air “I, Artemus, son of Daseem Ultor, swear by the Almighty that I will be just and bear true allegiance to the people of Necor. I will without fear or favour and to the best of ability and judgement, serve as a true and just leader of the people of Necor. Hereby as its leader, I dedicate my life to Necor and its prosperity.”

After hearing the speech, people started rejoicing and celebrating their new leader, “All hail Artemus”. The gloomy-looking people of Necor were now cheering with joy.

Starting from the first day itself, keeping the mayor as the head advisor, he starts selecting the ministers and other positions for the smooth welfare of the newly established kingdom. The current government officials in Necor under the king of Malazan who revolted against Artemus were either executed or were taken as prisoners. Notices were sent to neighbouring kingdoms, declaring Necor as an independent nation. Security was established around the island. Finally, total Law and Order were implemented. People were impressed with how smoothly things were going on.

News spread like wildfire about Necor being re-established as an independent nation. Upon hearing the news, Laseen got immensely frustrated, as his reputation was being tarnished all over. Seeing the King's frustration, commander ching bows and says, "Lord Laseen, please just give me the orders, I shall bring you his head on a platter."

Upon receiving a nod from the king, an evil grin split on the commander's face, he and his battalion set off to re-claim Necor.

Nonetheless, Artemus was expecting this, he had prepared to face the attack.

Both the parties arrive at the bridge, Artemus and his men on one end ready to defend the city, and Malazan's battalion and its commander eager to attack and take over the city on the other end. With the city as origin there are n (n is a positive even number) battle positions on the bridge, namely $x_1, x_2, x_3, \dots, x_n$, on which only one party can be placed per battle position.

They start destroying the battle positions one after another, taking turns until only 2 of them remain, after which Artemus' battalion takes the position with lesser coordinate and Malazan's battalion takes the position with higher coordinate.

The battalion of Necor being skilled warriors in melee attacks tries to make the battle distance between them as less as possible. Whereas, the battalion of Malazan being skilled archers tries to maximise the battle distance between them.

Being the battle strategist, Aegeus tries to determine the battle distance between the parties assuming both of them take actions in an optimal way.

“Hmm, so there are total $n-2$ moves, leaving $(n/2) - 1$ moves for each battalion. If we assume we end up at position l , and they end up at position r . Then all positions between l and r would have been destroyed by the other battalion trying to keep the battle distance as far as possible and all the battle positions outside $l-r$ would have been destroyed by our battalion trying to keep the battle distance as less as possible.

So it is guaranteed that there would be $(n/2) - 1$ destroyed positions between l and r .

The other battalion should always ban points between l and r at each step. As long as the other battalion doesn't know what segment we have chosen, after our every move, they must detect a point which satisfies the above condition. So they would choose the median among the set of positions that are left after our move.

In our moves, we can destroy some positions from the left or some positions from the right, except for the three middle positions. Two of it, (the leftmost and the rightmost) won't be destroyed by the other battalion soon as it could increase the size of destroyed positions from the left or right, but the third middle point always satisfies the optimality for the other battalion. This way they would always destroy the position inside the final segment.

Hence we result in a battle distance of the least value of ' $x_{i+(n/2)} - x_i$ '. ”

Feeling excited with the plan he made, he rushes towards Artemus and the mayor and explains his prediction. They all discuss a perfect strategy for the battle, recalling the past experiences from the battle, the mayor advises Artemus and the battalion about the enemies' fighting technique and how to counter it.

Both the battalions start destroying the battle positions on the bridge. Finally, when only two of them were left, they occupy their respective places and begin fighting each other.

A devil's smile split on Artemus' face, the calculated prediction of Aegeus became true. Their battalion was at a huge advantage. They charge at them with valour and become victorious.

After capturing the commander and his men alive. Artemus tells him to deliver a warning to the king on behalf of him, "Don't you ever dare to even think of laying a finger on my people. The nation of Necor is and will always be independent."

Showing them mercy, he releases them and sends them back to their Kingdom, as Laseen decides to take matters into his own hands and finish the Prince once and for all....

-CHAPTER FIFTEEN-

The Assassin's Gamble

The news of the lost prince's return spread like wildfire. People all over the kingdom were talking about this very event. This led to the kingdom being divided into 2 groups - people who supported Artemus and people who stood with Laseen.

The former group believed that since the prince was alive, he was the rightful heir to the throne. They believed that the prince was just as strong and just a person as his father. Moreover, the fact that Laseen had lied to them about the prince's death, made them doubt the story told by Laseen. They all thus understood that Laseen had taken up the throne by some inhumane way and wanted to support their rightful king to sit on the throne once again and rule the kingdom.

However, while there were many people that supported and believed in Artemus, there were some people who still followed Laseen. They mostly consisted of corrupted noblemen who, like Laseen, were selfish and put their own greed above the lives of the people in the kingdom. They believed that if Laseen was removed and Artemus got the throne, then they would no longer be able to indulge in their illegal

schemes. Thus, they stood with Laseen and promised to support him instead of Artemus.

The news of the prince's return also reached the royal assassin Moravid, who was in hiding after killing the royal soldiers and avenging the murder of his family. This was perhaps the first piece of positive news that he had heard since his escape years ago. He found new hope and resolved to find Artemus and place him on the throne instead of the evil Vizier, who was never the King in his eyes.

Amongst the news of Artemus' return, another shocking news started spreading. People learnt that Artemus was last seen in the continent of Necor. Necor was a continent under the kingdom of Malazan. Under the rule of the late King, Necor was kept as an independent land and the people of Necor lived a happy life. But under Laseen's rule, he had undertaken over Necor as well, and the people started suffering under his rule.

But now, the news came that Artemus had gone to Necor and had managed to take the holy sword of Necor, Kelanved. The sword could only be taken by the rightful owner who is just and true to the people of the kingdom. Artemus had taken the sword which had led the entire population of Necor to follow him and proclaim Artemus as their king. They supported Artemus and were willing to fight him against Laseen.

After hearing this news, Moravid's renewed hope increased even further. Artemus now had the entire army of Necor with him. Moreover, the kingdom of Necor believed Artemus to be their rightful king. Now came Moravid's duties. He planned to gather all the soldiers and villagers who wanted to support Artemus and take them to Necore with safety. If Moravid succeeded in doing so, this would increase Artemus' army and power significantly.

Moravid put on his fake disguise and stepped out of his hiding. He walked through the village. He could hear people murmuring and discussing the fate of the kingdom. He kept walking until he came across a young boy. He called the boy and asked him, “Do you know who I am?”. The boy looked confused for a moment as he observed Moravid’s face. Suddenly, his face lit up and he said, “Are you Moravid? The great assassin?!” Moravid smiled and nodded and said, “Yes I am and I have a very important task for you. I want you to contact every person in the kingdom who supports the prince and ask them to collect near the forest by the lake at 9 pm sharp.” The boy beamed and nodded and ran off to talk to the villagers.

Moravid then went towards the castle. He sneaked into the soldier barracks and found one of his soldier friends. The soldier was shocked on seeing Moravid and said, “Moravid! What are you doing here? I thought you had run away.” Moravid said, “I was in hiding. I came out because of the news about our prince which I’m sure you must have heard too. I am gathering an army to go support him. I want you to find all the men who support us in this cause and bring them to the forest near the lake at 9 pm sharp.” The soldier seemed apprehensive for a moment but then he nodded determinedly and walked off to find the other soldiers.

That night, Moravid waited at their secret spot. He was anxious whether many people would show up or not. He told himself that any number of people who show up would significantly help Artemus' army. He waited for a few minutes when he heard footsteps. He saw more than 20,000 people slowly gathered at the spot. They all looked determined and hopeful to help Artemus. Moravid couldn’t help but smile as he saw that almost half of the royal army had joined them. He gathered the people and said, “Thank you all for coming. These past years have been very difficult for us under the rule of villainous Laseen . But those days of terror are about to get over. We just need to cross this

river and march towards Necor and join Artemus' army.” The crowd cheered and they moved on to cross the river.

Laseen was now fuming with anger. He had heard the news from his trusted spy a few moments ago. Apparently, Moravid wasn't dead at all like he believed. He had been in hiding all this time. Moreover, Moravid had managed to gather an army and was marching to Necor. But Laseen would never let Moravid succeed with his plans. He stood at the terrace of the royal castle. He had his most trusted soldier with him. He had aimed the canon right at the bridge atop the river. It was the only way to leave the kingdom and Laseen was sure that Moravid will take his army via that very path.

Laseen kept staring at the bridge, burning with rage. Suddenly, he saw some dark silhouettes on the bridge. He could make out some humanoid shapes. He ordered his soldier to fire. There was a loud boom as the cannon blasted. Laseen strained to see as the smoke cleared. He saw that the bridge was burning and it had broken at the spot where the silhouettes had stood. Laseen laughed and his voice echoed through the entire castle.

Moravid closed his ears at the loud boom of the cannon firing. He stood in the secret tunnel with his entire army. He smiled as he realized that he had been successful in fooling Laseen. Moravid had known the news of their escape would definitely reach Laseen. He knew that Laseen was a heartless man and would kill anyone who dared disobey him. So, he planted some humanoid dummies made of wood and leaves on the bridge. Laseen had blasted the bridge thinking that he had killed Moravid and his army. Hence, Moravid and his army marched through the secret tunnel that led outside the kingdom, and continued on their journey to Necor.....

-CHAPTER SIXTEEN-

The Escape from Hell

After another day of hard work, Felisin was returning to her house. Waiting for her in an alley near her house was the priest, Hood. After the failed assassin attempt, all Felisin could think about was vengeance. She had requested Hood to find a way to escape this hellhole, so that she could exact her revenge on her sister.

The priest, having been reminded of his oath to Felisin's father, obliged and ever since that night he would roam the town housing the slaves looking for a way to escape the town. The law of the land dictated that priests couldn't be made slaves so he was allowed free passage to and fro from the town. Naturally, soldiers were suspicious about his activities but his show of blessing slaves made the soldiers think that he was just a missionary and the suspicions soon faded.

In the night, when he was sure that the soldiers weren't around him, he would travel various streets and use his priestly powers to check if there were any tunnels under the ground. He had been doing this search for multiple days now. Unfortunately, he had been unable to find any underground structure that could have been used for escaping. Up until now.

At last, after searching more than half the city he was sure he would have to dig a tunnel himself, maybe start from a two miles outside the city and then dig right under Felisin's house. This excursion would definitely take multiple months, if not years but alas it seemed to be the only option. He was headed back to the alley where he would usually wait to inform Felisin about his findings. Knowing that he had arrived early, he was curious about Felisin's house. Although he had been with her for more than three months now, yet he had never visited her house, rather only seen it from outside.

Seeing that he still had time, the priest decided to visit Felisin's house. He passed through her house's door to find a dingy room, with space only for a table and a bed. He was pitying Felisin and used his priestly power to study the house's underground, to make sure that the floor of her house wouldn't give way in the middle of the night. Mysteriously he found a spirit under the house.

"What are you doing under this house, O spirit?" The priest spoke telepathically to the spirit.

"Priest, you had helped me one of my kin in the past. I have seen your struggle to save this girl and thought to help you. Hence I took the underground of your house as my abode. In hope that you would sense me and I could help you back." The spirit replied.

"And how may you help me spirit? I have searched half the city and still haven't been able to find a proper route for escaping."

"Well then, it seems there are some magical powers you are yet unable to sense. Anyways my spiritual form allows me to travel pretty fast, so I also have information about other events, events outside the city."

“Can you elaborate.”

“Well due to some unexpected events groups of cities have rebelled against the Empire and now seek to create their own Empire. Some elements of the rebel’s army have now decided to free this minetown. They will be here in some days, attacking from the east walls.”

“That’s great, isn’t it? Finally we will be free without even doing anything.”

“Priest, I have walked in this town for many years now. There’s a silent decree in this town and in fact in all the slave towns of the empire. It states that when a town is about to fall to a siege all valuables should be destroyed so that the victors find nothing but ruins. These valuables, as you very well know priest, also includes slaves.”

“Does that mean that Felisin’s death is certain.”

“No, I have some magical power through which I can arrange for a safe passage for you two. The soldiers will be mostly located on the east wall, so the west wall will mostly be empty. I can open a portal there, since my source of power is very close to you. I hope you can handle any soldiers that will remain there, right?”

“Yes, surely. I thank you with all my heart.”

“Beware though, the portal only opens to the worthy. It will test you and you will have to pass the test to go through it.”

“We will pass the test, no doubt.”

“Okay then, when you hear sounds of war come to the west walls.”

And so the conversation ended. The priest informed all this to Felisin and they waited for the rebellion to start.

It was still dawn, before they were sent to the mines when they started hearing shouts and seeing arrows shot into the town from outside the walls. As predicted most of the soldiers strode towards the east walls. Together, Hood and Felisin trodded towards the west wall. As soon they reached there, a portal started forming in front of them. The few soldiers remaining on the west wall raised the swords, but the priest calmed them down by stating that he was performing a ritual for the victory of the Empire, sacrificing the slave beside him. The soldiers calmly accepted his explanation, clearly all of them being low ranked soldiers.

Having calmed the soldiers, the priest passed through the portal, his last words to Felisin being “I am sure you will pass the test.”

What test, Felisin wondered. She entered the portal. Suddenly there was a darkness around her. Then a voice suddenly thundered in her mind, Mortal, only the worthy shall use this portal. To prove your worthiness you must answer this question. You are given two integers P and Q . You have to find the greatest integer X such that firstly, P is divisible by X and secondly, X should not be divisible by Q . In big O notation, your solution should have a complexity around the square root of Q . Are you worthy?

Felisin had solved a similar question before, when she was young. She thought about it for a little while, then started speaking.

“Let $y = p/x$. Let's assume, that there exists prime a , such that a divides y , but q is not divisible by a . Then we can multiply x and a and

the result will still divide p , but will not be divisible by q . So for maximal x there is no such a .

Let's assume that there are two primes a and b , such that they both divide y , and both divide q . Because q is not divisible by x , there exists some prime c (c can be equal to a or b), such that the number of occurrences of c in x is less than the number of occurrences of c in q . One of a and b is not equal to c , so if we multiply x and such numbers, the result will not be divisible by q . So for maximal x there are no such a and b .

That means that $x = p / (\text{power of some primal divisor of } q)$. So to find maximal x , we have to find all prime divisors of q (we have to factorise q for it in time $O(\sqrt{q})$) and for each of them divide p by it until the result is not divisible by q . That will be all our candidates for greatest x . We will do all of that in time $O(\sqrt{q} + \log q \cdot \log p)$."

Very well, you are worthy. You shall pass. She heard in her mind. Then suddenly a thundering of colors erupted around her. She closed her eyes and when she opened her eyes she was in a silent alley of a city and beside her was the priest. Looking at the architecture around her, she knew she was in a city of the Empire.

Finally at last she was free. Free to exact vengeance. I am coming for you sister.

-CHAPTER SEVENTEEN-

The Beginning of the End

After nearly 4 entire days of travel, stopping only for rest and eating at night, Moravid and his army could finally make out the outline of the city of Necor. He could see the huge walls surrounding the city at a distance. He glanced back at the 20,000 villagers and soldiers who were following him to support the prince. They all were tired and restless after days of travelling, but Moravid could see the look of hope take over their gloomy faces as they spotted the city walls.

Hence, the group travelled the last couple of miles with an increased enthusiasm and a faster pace. Soon, they reached the city gates. The soldiers guarding the gates stood straighter spotting the huge army at their gates. The most senior looking of the 3 men stepped forward and asked, “What business do you have with Necor?”

Moravid stepped forward and said with as much confidence and authority he could muster, “We are refugees from Malazan and we have come to assist the lost prince to take over the kingdom.” The soldier walked back to his group and after a few moments of deliberation, one of the soldiers ran back inside the gates. Moravid hoped that the soldier had gone to call Artemus.

After about 5 minutes of waiting, the smaller door next to the giant door opened and a carriage led by 2 horses came out and stopped a few feet away from Moravid. A young man of about 20 years stepped out of the carriage. He wore white overalls and a deep red cloak around his neck. He gave out an air of authority and leadership by just standing there. But this was not what had captured Moravid's attention. He studied the face of the man in front of him and could clearly see the face of the late King. There was no doubt that this was indeed the lost prince of Britannia.

Moravid dropped to his knees and bowed in front of the prince. Behind him, his entire army followed suit clearly in awe of the prince. The prince motioned for Moravid to rise and said, "You must tell me you are before I let you in my city."

Moravid looked up but still remained kneeling, "Your Majesty, My name is Moravid. I served your father for many years as the royal assassin." The prince's eyes lit up in recognition. Moravid continued, "When the King tragically died, I continued serving Laseen and resumed my royal duties. But soon, I began to understand that something wasn't right and that Laseen was hiding something about the night the King had died. So, I secretly started investigating this and soon found out that it was Laseen who had killed the King and taken up the throne for himself. I had secretly started organising a resistance against Laseen."

"But Laseen discovered my hidden motives and killed my entire family assuming that he had killed me as well. I went into hiding as I couldn't do anything due to lack of resources and manpower. But your majesty, when I heard that the lost prince has returned, I came out of my hiding and gathered all these men who swear allegiance to you. We are here to aid you with any means possible. We believe that you are the

only rightful heir to the throne of Malazan and we want to help you get back the kingdom and kill the evil Vizier.”

The prince was silent for a moment as he digested Moravid’s story. He finally put his hands on Marvid’s shoulders urging him to rise and said, “I believe you Moravid and thank you for your bravery and loyalty to the crown.” He then raised his voice and addressed the crowd, “You all may rise. I appreciate you travelling all this distance and coming to my aid. I promise shelter and food. You are all safe here. You may all rest until we have definite plans.”

The prince turned towards his soldiers and asked them to open the gates and escort all the people to the city barracks and ordered hot food to be prepared for all. The crowd slowly dispersed through the gates thanking the young prince as they went. When all the people had left, the prince turned towards Moravid and said, “You may accompany me to the palace, Moravid. We can discuss the strategies and politics for this situation.” Moravid and the prince got into the carriage and went inside the city gates.

Moravid was awestruck as he looked at Necor through the window in the carriage. He had never seen any place as beautiful as Necor. The island was surrounded by a beautiful sea that shimmered in the sunlight. The streets were filled with large green palm trees. What made the city even more beautiful were its people. Children were running across the streets, climbing trees and playing. All the people seemed to live in harmony and peace. There were sounds of laughter and general happiness everywhere.

Artemus smiled and said, “I know what you are thinking. I felt the exact same thing when I first came here. This place is indeed heaven on earth. This is what I want for Brittania as well. I want the people to leave fearlessly and happily forever.”

Moravid said, “As long as we have men like you on the throne, the people can never suffer. If you don’t mind my asking, how did you manage to survive?”

Hence, Artemus recounted all the events to Moravid. About how a soldier had managed to get Artemus out of the castle safely without Laseen knowing. He recalled how he had trained for years with the holy sage and how when he was finally ready, he went from village to village helping people and finally reaching Necor.

Suddenly the carriage stopped. Moravid looked outside the window to see that they were at the gates of the palace. A soldier rushed to the carriage and said, “Your majesty, there is a woman who wants to meet you. She is refusing to leave until she gets an audience with you.”

Artemus stepped out of the carriage wondering what could be so important that the woman couldn’t wait. He saw a beautiful woman standing at the gates. Though her clothes were messy and torn like a slave’s, she still had an air of authority and confidence. Next to her was a man who seemed to be a priest. He seemed as authoritative as the woman next to him. Artemus concluded that they were no ordinary villagers and indeed had some important motive to talk to him.

The woman stepped forward and bowed a little and said, “Your majesty, apologies for stopping you mid way but I’m afraid, this matter is of somewhat urgency. My name is Felisin Palan and this is the holy priestHood. He helped me escape my slavery and used his powers to teleport us to these lands. I understand that you are gathering an army to defeat Laseen. I have my own motives to defeat him and to personally kill one of his trusted noblewoman. Therefore, I’d like to offer you my support and allegiance and help you take over the kingdom.”

Felisin then told them her story. About how she was an honorable noblewoman before her own sister betrayed her and sent her to work in the mines as a slave. When her sister had sent assassins to kill her, Felisin had resolved to kill her and thus wanted to help Artemus in order to exact revenge on her sister.

Artemus listened to Felisin's story and said, "Felisin, you are a brave woman who has remained unbroken by years spent in the mines as a slave. You are clearly not just an ordinary woman. I would be honoured to have a fine strong woman like you to join my army. And you priest Hood," Artemus bowed before the priest who raised his hand to bless Artemus, "You are a man of honour. You kept your promise to protect the Palan family and have maintained your fidelity. I gladly accept you to join my army and help us all in this mission. This is Moravid, the royal assassin; he, along with his army, have sworn allegiance to me well. We were going to discuss our battle strategies for tomorrow. You may join us." Felisin and Hood both knelt before their majesty to show their loyalty towards him and they all entered the palace together and immediately retreated to the meeting room to discuss the plan.

Thus, the prince, the assassin, Aegeus, and the noble got together and spent hours brainstorming and finalising their strategy for the attack on Laseen. These were perhaps the world's four greatest minds, together, discussing and devising a plan to overthrow the evil and bring peace in Malazan once again.

The next day, Artemus' entire army had gathered outside Necor. It was a sight to behold as thousands and thousands of men stood in perfect formation with their heads held high and hope and strength in their hearts, looking with pride at the 3 leaders that stood in front of them. They would soon begin their march to Malazan, led by Artemus, Moravid and Felisin. Artemus turned towards the army and said,

“I will be forever grateful to you strong men for coming to my aid and helping me in our united cause. This journey that we are about to set on will not be an easy one. We will all have to endure hardships and face difficulties. But each one of you has a very important role to play in this battle. Let’s gear up and march as one and defeat this evil that has taken over our beautiful kingdom of Malazan. Today, we raise our swords for every innocent who has died at the hands of the merciless tyrant who is sitting at the throne. Let us fight a battle that will remain a legend for generations to come!”

The entire army cheered and thumped their shields on the ground to show their support for Artemus. It was the most beautiful sound any of them had heard. And just like that, they all began their march to Britannia to kill Laseen.

-CHAPTER EIGHTEEN-

The Final Stand

Artemus hadn't let his previous defeat carry him down. While last time, he just had the support of Villagers, who despite being valiant and brave, lost due to the sheer strength of Laseen's army, this time he had an army that was comparable to that of Laseen's. While Laseen's army took a great toll in the battlefield of Kerman, it was due to the defection of many of his soldiers to the Prince's side, the alignment of the whole country of Necor with the Prince, that Laseen wasn't so confident of another victory.

Upon many requests from Felisine and Artemus, the Priest Hood had agreed to give some magical powers to the soldiers of the army. With the State Alchemists of Necor on side of Artemus as well, he felt that it was indeed a battle of equals. As Artemus marched with his grand army to the Kingdom of Malazan, they decided to form their base in front of a Valley that stood facing the Castle of the King, where once Artemus resided, and now was occupied by the treacherous Laseen. Artemus sent a Royal Messenger to Laseen's court, that asked him to either surrender and return the Crown of the Kingdom to the Prince, or to face him in the challenge of war. After seeing the bloodshed that happened in the previous war, the Prince was hoping to settle this

without having to lose more lives. However, he knew that the evil Vizier indeed didn't value the lives of his soldiers or people, and would try to fight the Prince and wouldn't give his Kingdom without a war.

Upon hearing the message of the Prince, Laseen laughed, and shouted "That self-proclaimed Prince tries to challenge me. I have ruled this Kingdom for the past seventeen years, and fakes like him cannot overthrow me with such ease." and he tore apart the message of peace that was brought forward by the messenger. It was indeed war - a war of the highest magnitude. With his army commanded by the Assassin, Artemus was sure of a victory.

It was a clear morning, with the sun over them as though it was giving them its blessings for the battle. With Hood's and the State Alchemist on his side - Artemus also had a trump card in his hand - he could summon DRAGONS to fight the mighty Chimeras that had previously been the reason for Artemus' defeat. As the army of thousands stood on the other side of the valley, Laseen also had brought full support of his army. However, Artemus again possessed the advantage here, as he was on the side of the valley that had the mountains, whereas Laseen stood on the flat side of the valley. He had again placed Archers, as well as spell users hidden in the Mountains. Using the Dijkstra strategy from before, he had also assembled more than ever cannons, armours, enchantments, in addition to the heavy resources he had availed from the Necor.

Since the hidden spell users were State Alchemists, they were accomplished to destroy the Chimeras and other creatures using the magic that was emanating from Hood. However, in order to do so, it was necessary that the magic emanating from him reached every magic user. The places where each Alchemist had hidden were all interconnected by various paths, and the more paths that the magic of Hood would spread over, the lesser would its strength become. Artemus

had to decipher this problem, and to solve it, he represented the places where each Alchemist had hidden as a node, and the paths connecting them as edges, with the weight of these edges as the distance of the path. Now, he knew that in order to solve the problem, he had to find the Minimum Spanning Tree of the graph. Artemus grinned as he spoke to himself, “It's *Prim's Algorithm*.”

Now, he initialises the tree for connecting as an arbitrary node, i.e. an Alchemist. Next, he creates a heap to store the edges, i.e. the distance of the paths, and grows the tree by one edge, of the edges that connect the tree to the vertices not yet in the tree, he chooses the one of minimum weight, and transfers it along with its connecting node to the tree. He repeats the process as the tree keeps propagating to include all the soldiers to supply the power - the power that could just ensure their victory.

As the trumpet for the war sounded in the arena, both the armies had their soldiers - the cavalry, the infantry charging at each other. However, this time Artemus had an equal hand in physical powers as well. Having the soldiers and Alchemists cast arrows and spells was of no use as the enemy had learned from the previous experience. Despite this, the soldiers, who were being led by the brave Moravid, with the powers granted from Hood, were slaying the enemy soldiers. As Laseen, who still stood atop his tower in the castle as the war continued to rage in front of him, saw his soldiers dying in mass numbers, despite having checked for traps like previous time. It was at this moment he shouted, with a grin on his face, “Unleash the Chimeras!!!”.

This was something that Artemus had expected, as he screamed, “Hood, it's time!”, and suddenly, the whole battlefield was filled with a blinding flash. Moravid, who was commanding the army gave the order at that very instant, “Unleash the dragons.” Laseen watched in horror as the white emanating light, coming from the holes in the mountain killed

all the mighty Chimeras that were his trump card. Hardly an instant had passed, when he also saw fearsome fire-breathing dragons rise on the enemy's side. His army was in shambles, as the fire breathing creatures started to annihilate the army. Some of the bravest soldiers in Vizier's army tried to take them down, along with the support from the Alchemists. Many of them sacrificed their lives in protecting the cunning Vizier - not because they liked Laseen, but because it was their oath to serve the person who sat on the throne, even if they knew he was evil.

With spells flashing from Laseen's army, they managed to take down the dragons that were unleashed upon them. Felisin stood smirking as Hood had indeed proven to be vital to their expected victory. Now that Laseen's army was almost obliterated, Moravid came to Artemus and Felisin, and spoke, "Your Majesty! I shall clear the path for you, for you must now enter the castle soon, otherwise seeing his army losing the battle, Laseen and Travaore shall flee from the castle, and we won't be able to accomplish victory in the battle." Artemus and Felisin nodded, as Moravid, who was covered in the blood of the enemies that he had slain, jumped on his horse and cleared the path straight to the King's castle, with Artemus and Felisin following on horses. Artemus also killed various enemies who tried to attack him from the sides, as the Sword of Kelanved unleashed a bolt of lightning with each swing. With his magic, Artemus was able to give enough push to the horses to cross the trench of water surrounding the Castle, and entered Laseen's lair.

Both of them held their swords in a defence stance, expecting great resistance. Moravid had stayed outside to stop any more soldiers from getting in, and to continue leading the army. However, to their utter surprise, the castle was indeed empty. Felisine told Artemus, "It appears that all the soldiers had gone outside to fight. There must be traps on the way to guard the King, be careful." They knew that Laseen stood on top of the Southern tower, and Travore must be in the Western

tower, strategizing for laseen's forces that, and they both rushed on the stairs that led to the rooms. However, in between the stairs that led up higher into the castle, they both noticed a pit of lava! However, there were some blocks of rock in between as well. Artemus knew that he couldn't reach the other end simply by jumping on the blocks ahead of him.

The pit could be visualised as a grid, of size $m \times n$, and some of these contained lava, while the others contained rock. Using his ice magic, Artemus could turn some of this lava into rock by firing it on the lava. However, Artemus wanted to preserve his strength to fight against Laseen, and use the spell minimum number of times possible. Seeing the serious expression on Artemus' face, Felisin understood his thoughts and began to think of an optimum way to cross the pit. That's when it struck her - 0-1 BFS. Now, she represented all the lava or rock cells as node of the graph, and gave weight 1 to the edge that connected a lava node, and gave weight 0 to an edge connecting 2 rock nodes. Since there was just a one block path at (n,m) index, from where she could exit. Now, she had to start the *0-1 BFS* from the $(0,0)$ node and find the shortest path to the (n,m) node. She uses a double-ended queue to store the nodes, and initializes it with $(0,0)$, and if an edge has weight 0 while performing BFS, then the node is pushed at front of the deque, while if it has weight 1 while performing BFS, then the node is pushed at the back of the deque. Now, we pop the front node, and find the distance to all its directly connected nodes. If any of these distances is lesser than the current distance for the nodes, then this node is inserted into the queue, and its distance and the parent node are updated accordingly. Repeating this process until we finish all the nodes, we get the minimum number of spells with the corresponding path to cross the pit.

As Artemus uses the magic hardly 4 times and crosses the pit that seemed to be filled with LAVA, he and Felisine parted ways, for the King was on the Southern tower, and Travore somewhere on the

Western Tower. As they both rushed, their souls were burning - burning for REVENGE!

-CHAPTER NINETEEN -

The Sister's 'Love'

Zap, and the final soldier guarding Travore's room had also been sent to his heavenly abode. Felisin had put to death all the soldiers standing in her path to Travore's room, courtesy of the magic the priest had taught her. Now her revenge would be pure, just Felisin and Travore, her sister.

With a loud thud, Felisin opened the door to the hall where her sister was reportedly present. And Travore was there. Twenty paces ahead of her. The hall was brightly lit, with fire sticks on the wall every five paces. At the end of the hall was standing Travore wielding a two-handed sword. A bunch of bodies lay throughout the hall, most of them being prince's soldiers. The bodies were spread at seemingly random places, as if Travore was moving and fighting throughout the hall. But strangely, there was no blood on her sword.

"And so we meet again sister." Travore said, her dark eyes glaring shatteringly at Felisin's.

"And this shall be our final meeting, hopefully." Felisin said.

“That it shall. And you shall be so ruthlessly destroyed that your body will be far from identification. And then I shall rest peacefully.”

“Tell me sister, why do you hate me so much?”

“You ask this of me, Felisin? Don’t you already know the answer. You made my life a living hell. I was younger than you. And you made full use of that fact to steal all happiness from my life. You were already a master in multiple fields, be it fighting, studies or any field in which I was even remotely interested in. I being young could not be at your level so early. Yet everyone compared me to you. My friends used me to get access to you. Sometimes I felt that they were my friends only because I was your sister. Even father and mother told me to be more like you and preferred you over me. You were always their favourite daughter. Be it any gathering or festival, people always talked about you first, and then they mentioned me to be following your footsteps. I was always the second, never the first. Always the shadow, never the body. And all because of you. I shall kill you now sister, and finish my revenge for all the wounds you have afflicted me with.”

“Your idiocy knows no bounds, Travore. Taking revenge on someone for being better than you? Is that how low you can get? Pettiness enough that even Satan shall shy away from you. When I send you to Yamraj, sister, the world shall cry in happiness.”

Suddenly the door from which she had entered the room snapped shut.

“To kill me, you should have to reach me first. Felisin. This hall has magical spells. As you can see, this hall is scattered with bodies and yet my blade is clean. None has been ever able to solve this maze sister. And now that there’s no escape from this room, should you not be able to reach me within 20 minutes, I shall have gathered enough magical

power to destroy your magical defences and kill you. Haha! You are trapped now Felisin with no way out but death.”

Felisin went to the depths of her mind to try and understand the magical simulation ahead of her.

The path from Felisin to Travore’s position could be divided into n points. The path followed in a pattern, where firstly there was no magical power for g seconds and then deadly magic emanating across all points for r seconds. Felisin termed the peaceful period as green signal and the period filled with deadly magic as red signal. This path can't be always crossed in one green light. There are some points known as safety islands on the path. Felisin can relax on them, gain strength and wait for a green light. She won't be affected by the deadly magic if she's on such a point during red signal.

Formally, the path can be represented as a segment $[0, n]$. Initially, Felisin is at point 0. Her task is to get to point n in the shortest possible time.

She knows many different integers d_1, d_2, \dots, d_m , where $0 \leq d_i \leq n$ — are the coordinates of points, in which the safety islands are located. Only at one of these points, the lass can be at a time when the red light is on.

Unfortunately, the magic has also imposed some restrictions on Felisin’s movements.

She must always move while the green light is on. Felisin can change his position by ± 1 in 1 second. While doing so, he must always stay inside the segment $[0, n]$.

She can change his direction only on the safety islands (because it is safe). This means that if in the previous second the girl changed his position by $+1$ and she walked on a safety island, then she can change his position by ± 1 . Otherwise, she can change his position only by $+1$. Similarly, if in the previous second she changed his position by -1 , on a safety island he can change position by ± 1 , and at any other point by -1 .

At the moment when the red light is on, Felisin must be on one of the safety islands. She can continue moving in any direction when the green light is on.

Felisin has crossed the path as soon as her coordinate becomes equal to n .

This was all that Felisin was able to gather about the magical system between her and her sister. She also had to cross as soon as possible so that her sister was unable to gather enough power to defeat her. Hence finding the path taking the least time would be the best possible solution. Also she couldn't waste all her time in using the solution, hence the solution should be fast to calculate.

She thought about it for a little while. She knew that Dijkstra would be very useful in this case, but it was not so simple. Then it struck her mind. *2-D Dijkstra!*

She thought for a little while. Then stumbled upon the solution. If we somehow came to safety island and time $i \bmod g$ (\bmod - is a remainder after dividing i by g), we don't need anymore to come to this island at time j where $i < j$ and $i \bmod g = j \bmod g$, because this will form a cycle.

So that we can rephrase our task like this: we have some vertices, which are denoted as a pair (i, t) , i - is island index, t is a remainder after

dividing the time we came to i by g . So it surely will be enough to use only the edges between given vertices $(i,t) \rightarrow (i+1, (t+a[i+1]-a[i]) \bmod g)$ and also $(i,t) \rightarrow (i-1, (t+a[i]-a[i-1]) \bmod g)$, because all remaining edges can be expressed through these ones. Now let's notice that edges, which make time $t+a > g$ can't be used due to restriction of walking on red. But vertices with $t+a = g$ are good for us. So we can say that while green light is on, Denis can walk without restrictions, and when $t+a = g$ we add $g+r$ to time. So we can use 01-BFS to solve this task and at the end check and find the vertex and position from which we can go to our final destination.

Time complexity will be $O(g \cdot m)$.

Felisin quickly calculated the best path using this algorithm. Fortunately she was able to reach her sister in time.

Travore was in utter shock. But before she could say anything, Felisin struck her knife into Travore's heart. And so Travore died, with the look of shock and betrayal on her face.

"Farewell sister. May the world never stumble upon your likes again." Felisin said. And thus the tale of her vengeance finally found an end. She reminisced about the bitter-sweet memories spent with her Sister, how she loved her, as she cried, "I loved you. But....." as words refused to even leave her mouth. She decided that now that she had realised her vengeance, she set out to help the Prince's army still waging war against Laseen's soldiers.



-CHAPTER TWENTY-

Vengeance Unleashed

Artemus prodded stealthily. His path to Laseen's stronghold on Southern tower had remained uncontested, and he was beginning to wonder whether Laseen had escaped along with his soldiers. An honorable king would have fought with soldiers up till the very bitter end. But Laseen had no honor, and the prince knew that. Hence he hurried his steps.

He could have allowed Laseen and his bodyguards to escape, the first act of mercy from the new king. But he knew that the escaped Vizier would do nothing other than thinking how to usurp the throne once more, and hence sparing Laseen would mean inviting his own demise. Moreover Laseen had killed his family, his loyal guards. And it now fell on the prince to exact vengeance for his fallen familiars.

The prince was now close to Laseen's quarters. He kicked open the gate to find a weird scene before him. The roof of the stronghold had broken and he could see a black abyss flying in the sky above him, moving swiftly away from the kingdom. The prince knew that Laseen was in the black cloud, the cloud probably being the creation of his magic. The prince wasted no time in chasing them and whisted in a

mystic way to call upon his own dragon. The dragon arrived in no time. The prince soon settled upon the dragon and then they were flying in chase of Laseen.

Laseen's dragon may have been fast, but the prince's was way faster. They were soon near the black cloud and soon entered it. The prince, still seated on his dragon, found the dragon to be standing on a mystical leaf, big enough for a score of humans to stand on. He could see multiple such leaves all around him, with every leaf having a number written on it. Artemus looked down and saw that even his own leaf had a number.

Ahead of him, on another leaf was Laseen. There were no soldiers around him. He had escaped alone, having only a single dragon for travelling. Although he was far away, when Laseen spoke the prince could hear him clearly.

"O prince so at long last you have arrived. Thinking you will get your vengeance? Hah! How arrogant and foolish of you." Laseen roared.

"Well you shall soon see if there was any arrogance in my action. My sword will soon speak on my behalf." The prince said in a confident tone.

"Hah! I see now prince. Ever unwavering even in the face of the death. But let's see how you fare when you are but moment from your death!"

"I don't think you will be able to know that, since you may soon depart from this world."

"How can someone be so foolish I wonder! Or perhaps it runs in the family. Your father was even more foolish than you. Even after

hearing of my suspicious activities multiple times, he still held faith in me. And that faith eventually led to his deep slumber.”

“Silence, Vizier! No talk of my father. You betrayed his trust. And you shall soon face his wrath from my sword. And how, after maintaining brevity in the royal meetings so long ago have you now turned so loquacious? Are you trying to buy time to escape?”

“Well yes a little bit of that. But anyway time is not a problem. These leaves follow specific patterns. You cannot simply jump from one random leaf to another and reach me. And even a single wrong misstep can entirely annihilate you. So I have no worries. And by the time you figure out the pattern, this cloud shall be in a familiar territory of mine, where magic of my kind looms abound in plenty. And there you shall face my unbound wrath. Only thing that is certain in your future is now your death.”

The prince thought for a little while. He knew that time was short. Were Laseen to reach the homeland of his magical powers, the prince would be slain with ease. Time was of the essence. Hence he knew he had to find the pattern soon or he would be dead meat.

He looked around on his leaf and found some stones alongside him. He threw a stone at another leaf. The stone burst into flames, he did this multiple times and was witness to multiple stones bursting into flames. Finally a stone he threw reached another leaf and landed with the thud. He looked at the number on his leaf and the number on the leaf. He was unable to figure out what was the special relation between them.

Then he looked at the other numbers around them. He could figure out that all numbers were unique. He thought for quite a long while. Time was short on his hands. He had to figure out the pattern

soon or he would join his father in the heavens above. Then suddenly, as if struck by lightning, he figured out the solution.

Consider a graph on k nodes, with numbers from b_1 to b_k written on them. These number b_i represent the number present on the leaf while the leaf is the node itself. For every i from 1 to k : find such j ($1 \leq j \leq k$, $j \neq i$), for which $(b_i \oplus b_j)$ is the smallest among all such j , where \oplus denotes the operation of bitwise XO. Next, draw an undirected edge between vertices with numbers b_i and b_j in this graph. The resulting graph is the list of all possible edges and choosing to travel on any nonexistent edge will inevitably lead to death.

He threw a few stones to test his solution and he was in fact right. Now all that was left was to figure out the graph and then reach Laseen. He had a $O(n^2)$ solution, wherein he would find the xor between each pair of numbers and accordingly find the graph. But he knew that would take too much time. And he didn't have enough time. Hence he had to think of a better, faster solution. Something that was around $O(n \log n)$.

He thought about it hard. For a little while. He tried to recollect his knowledge of xor problems. He could remember using xor tries a lot for xor related problems. After thinking for a while a solution struck him.

Using Trie Data Structure, you can solve this problem in $O(m+n)$ if we know that values are computer integers (e.g. all 32-bit or 64-bit values).

The prince knew that all integers on the leaves are 32-bit values. He used the following steps:

Firstly, Create an empty trie. Every node of trie may contain at most two children for 0 and 1 bits.

Then, Insert all values present on leaves into the tree in $O(32 \times n) = O(n)$.

For each value present on the leaf, traverse the tree from the leftmost bit. If a bit doesn't match with child of a middle node, continue the traverse using the existing child until you reach a leaf. Also use a cnt value on the trie so that we don't end up xoring the number with itself. Traversing finishes in $O(32 \times n) = O(n)$

Which in total, the complexity is $O(n+n) = O(n)$.

This complexity was sufficient enough for him and he was soon able to draw the graph. Then he used dfs to find a way to Laseen. On finding the path he started on the path, hoping to close on Laseen soon.

Laseen on seeing the prince approaching him and not being engulfed by the deadly magic on the wrong paths, was shocked to say the least.

“How is this possible!” Laseen croaked.

The prince soon reached him. “And now Vizier, you shall receive the ultimate vengeance, for regicide.” He said. Laseen was still in a state of shock and just looked fearfully at the prince.

The prince then dismounted his dragon, rushed towards Laseen and finally pierced the tyrant's heart using his sword. Breathing heavily, as Laseen's dead body lay in front of him, tears flowed down his face. He had finally exacted the revenge that he had waited for Seventeen years. With the skies now cleared up, the Prince returned back to the Royal Castle. The battlefield was completely covered in blood, and now most of the enemy soldiers had surrendered to the Prince's army. He got

off, and stood on the platform, which was once occupied by his own father to address the country.

With the countrymen, all gathered to behold the sight, he shouted, “I, Artemus, the King of Malazan swear to bring prosperity and justice to this Kingdom. What Laseen had taken away from this place, I swear to restore unto this land, peace, prosperity, and justice.”

The crowd burst into tears and applause, as after a dark period of seventeen years, the Royal Blood had finally returned to the throne. Moravid and Felisine, both teary-eyed, shouted, “Long live the King.” which was followed by the chantings by the entire crowd.

-EPILOGUE-

The Next Generation

Nineteen Years Later.....

Under the new King Artemus, justice and prosperity prevailed in the Kingdom. Slavery had been abolished in the Kingdom, and all the citizens lived their lives freely and happily under this rule. Wherever the eye went, one could see happy children and citizens enjoying their lives. With the support from Hood as the newly appointed Head of the State Magicians, the power of the Nation had also grown substantially. After their battle against their respective foes, and exacting their revenge, Artemus and Felisin had fallen in love with each other. They had a grand marriage, and all of the public had come to witness them taking their vows. All the Vizier's supporters were captured, and the Kingdom had been peaceful for so many years....

Celebrations were going on in the Kingdom for the birth of the new Prince. Artemus and his Queen Felisin stood on the platform, with their newborn son, waving at the joyed crowd. In the happy and joyed crowd, however, stood a figure with a face that was fuming with anger. His fists clenched in anger as he could still feel his burning rage towards

the Emperor and the fact that while he was tending to his own son, he had taken his father from him. Nineteen years, it had been, but the flame of vengeance inside his heart had never died. Salim Baratheon, the son of Laseen Baratheon at this very moment, swore to destroy the King Artemus.