

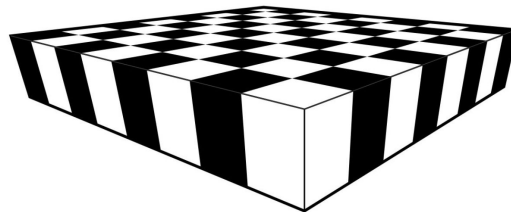
Professor: Jennifer Stamm, PhD
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MAE 364 Manufacturing Processes

Comparative Analysis Project
Gate 2 - Project Planning

Group Members:

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KING

Damian

The king that I have chosen to design is based off of a hat resting on a coat rack. In this design, there is a coat rack with a crown on top. The crown is what distinguishes it from the other pieces and represents that it is the king of the board.

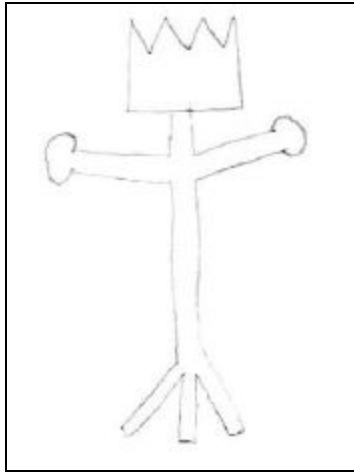


Figure 1: Damian's King

Vladimir

The king for my set is a chef's hat. It will be the tallest piece and will be in the form of a cylinder attached to a sphere. There will be ridges extruded in the design to simulate the puffiness of the chefs hat.

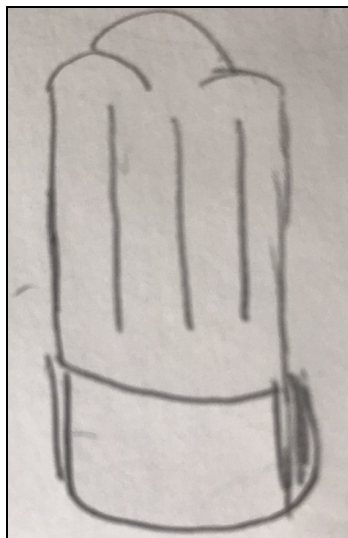


Figure 2: Vladimir's King

Ashraf

The design of the King was inspired by crowns and royal mantles from the Middle Ages in Europe. The base will be circular and flat allowing easy placement on the chess board.



Figure 3: Ashraf's King [1]

James

I have selected an archetypical crown for the king. This piece in particular is important to be recognizable. The crown sits on a stand, holding it above the other pieces, and ensuring the weight distribution is correct for a chess piece. Slight additional details have been added to the crown to add to its unique look, such as the point atop the crown, and the bumps along the edge of the base.

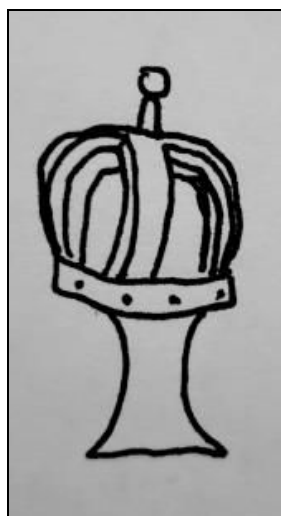


Figure 4: James' King

Wenzhi

For my design of the whole set, I chose to create ancient Chinese themed hats. My design of the king is a very iconic crown for ancient Chinese kings. The chain-like “curtains” in the front and back are made of jewelry and its purpose is to prevent people from looking directly at the king’s face. The base is a cylinder and a flat board will be attached to the top, then small chains will be attached to both ends of the board. Detailed patterns can be carved onto the base to make the design more special.

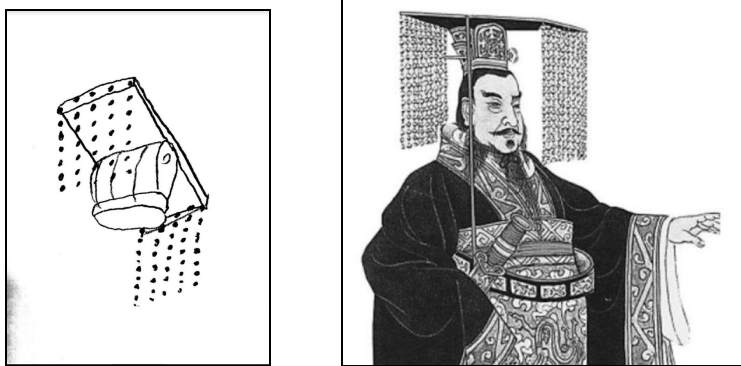


Figure 5: Wenzhi's King [6]

Ayesha

The overall design chosen for different kinds of hats for the characters is focused to represent the different classes of people in a society.

The hat design chosen for king, is a very traditional one. A King's crown is taken as the symbol of hat and the design has a broader width of hat, to give it a little extra dimension and to focus on the importance and significance of the character as compared to others. The very middle part of the hat will be elongated as shown below in the picture to make it more different from the Queen's crown, which will be smaller in design. Also, the king's piece can be a little elongated compared to the Queen's piece.

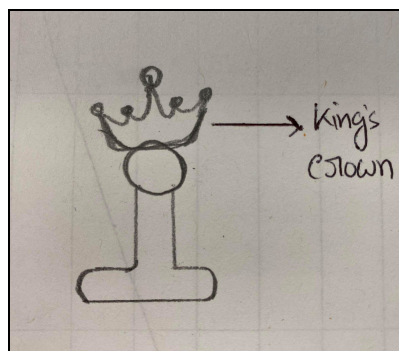


Figure 6: Ayesha's King

QUEEN

Damian

I have chosen to make the queen a bust of Queen Elizabeth II, with a hat that she always is wearing. The hat has a wide brim and a flower on the left side of it when you face it.



Figure 7: Damian's Queen

Vladimir

The queen will be a nurse hat. It will be a diverging circle connected to a conical shape in the middle. The piece will sit flush on the chess board. There will be a cross on the front to signify the job.

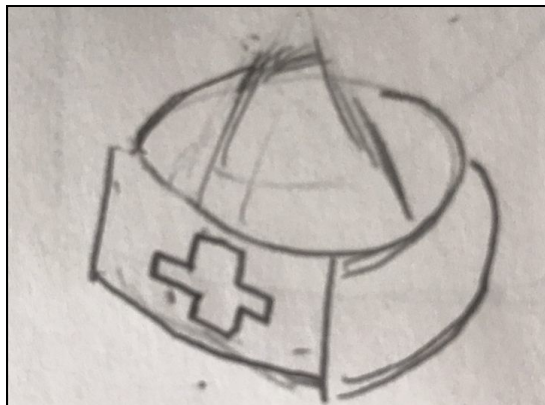


Figure 8: Vladimir's Queen

Ashraf

The design of the Queen was also inspired by crowns from the Middle Ages in Europe. The crown of the Queen will hold large jewels. The shape and the jewels on the crown will make the Queen distinguishable from the King of my set.

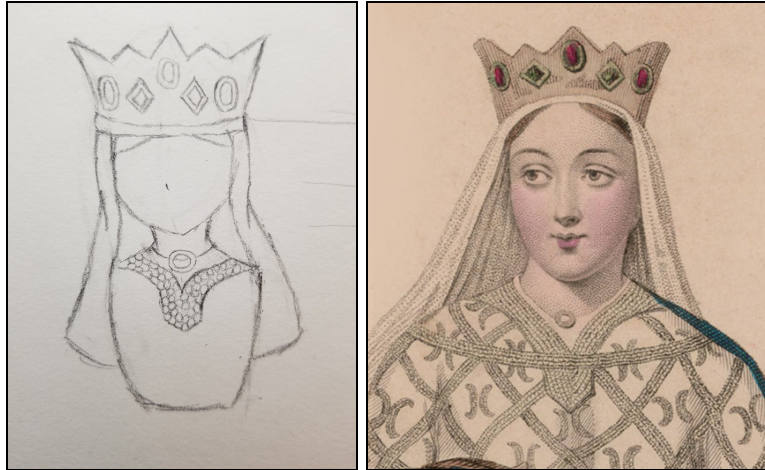


Figure 9: Ashraf's Queen [2]

James

For the queen, I have chosen a wizard's hat, as its height and size will be more noticeable compared to other pieces. The tip of the hat can lean or be upright depending on the relative cost of either choice. The brim extends off the stand for a short distance. It sits on a stand to bring it to the appropriate height and weight distribution, like all others in my design set.

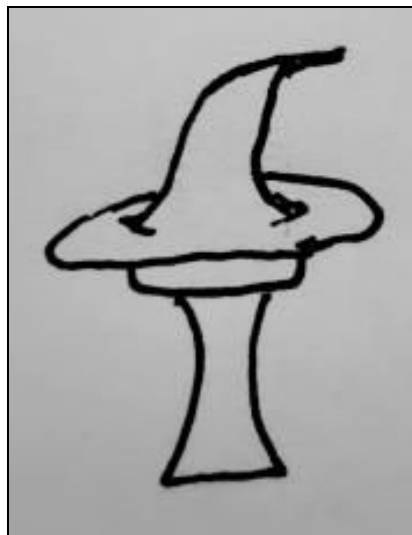


Figure 10: James' Queen

Wenzhi

The actual crowns for Chinese queens are too complicated and almost impossible to manufacture considering the size of the chess pieces. I chose another iconic appearance of queens, which is more common in TV shows. The queen's hair was formed to a certain shape and many different decorations were put onto the hair. The base is a hemisphere shell with a thin line pattern on it to represent the hairs, and a curved board will be attached to the top. Different drawings will be painted on the board to represent the decoration.

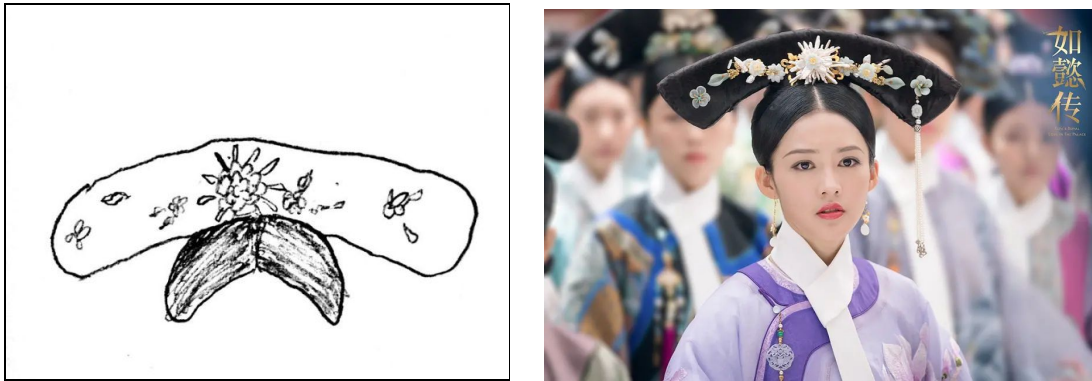


Figure 11: Wenzhi's Queen [7]

Ayesha

Similar to the King's piece, a traditional hat was chosen for the Queen's piece, along with a little crown on top of the hat. The hat will represent the traditional aspect of the character while the crown represents the strength of the piece.

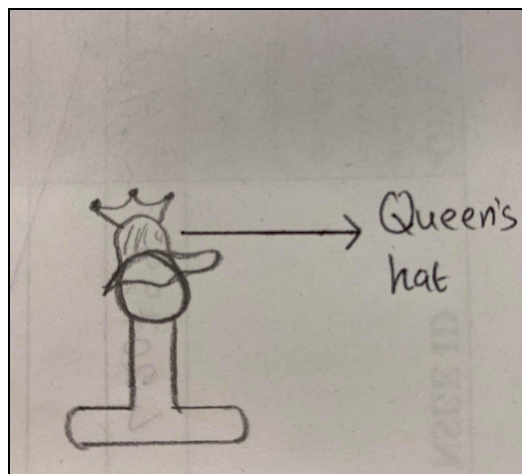


Figure 12: Ayesha's' Queen

ROOK

Damian

I have chosen to make the rook a train conductor's hat. The hat has a slightly curved brim that sticks out of a hat that is very cylindrical. Two slightly sticking out accents are also on the top and bottom of the hat.

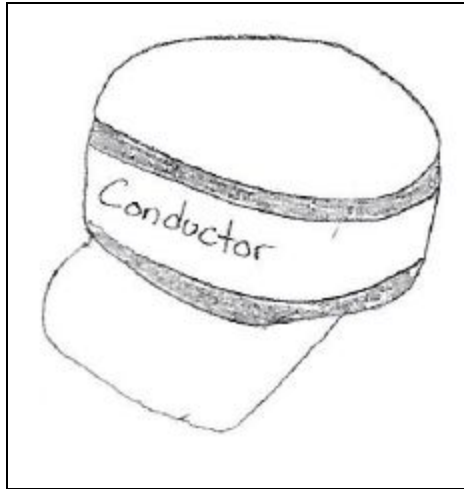


Figure 13: Damian's Rook

Vladimir

The rook will be a police hat. The police hat will have a curved brim and be circular in shape. The top will be indented to show that the hat is not solid. There will be small circles on the brim to show accolades or badges. The piece will sit on the front and back of its brim.

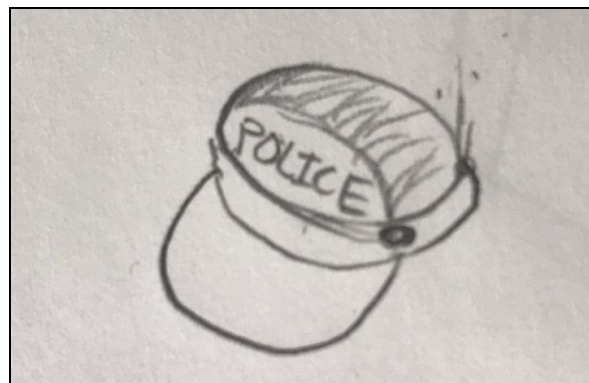


Figure 14: Vladimir's Rook

Ashraf

The Rook of my set is represented by a stone mason's hat from the Middle Ages in Europe. The feather on the hat is a unique feature of this chess piece and can be used to distinguish the Rook from other pieces. Rook resembles a castle. The mason's hat is a good way to represent the Rook.

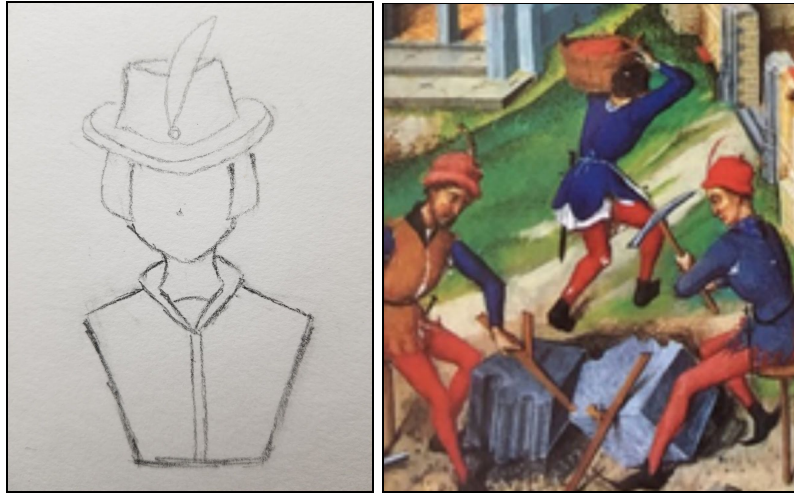


Figure 15: Ashraf's Rook [1]

James

My rook is a top hat. It stands upright, like a normal rook, with a brim around the stand. It sits on a stand to bring it to the appropriate height and weight distribution, like all others in my design set.

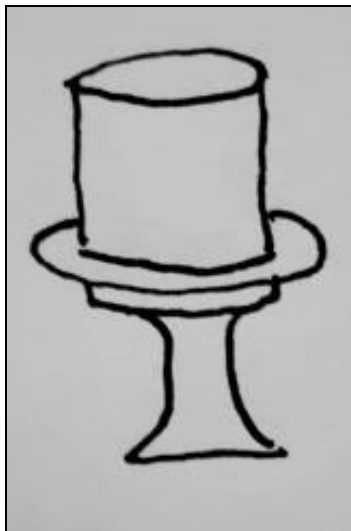


Figure 16: James' Rook

Wenzhi

It was hard for me to come up with some hats to represent the castle. Thus, I chose the helmet of Chinese generals, the ones who defended and protected the castles. This is also a very representative appearance that people can easily recognize. A hemisphere will be made to be the base structure of the helmet, then shaped thin plates and stick will be attached to the hemisphere. Red furs will be attached to the top of the stick, and the patterns on the helmet will be painted.



Figure 17: Wenzhi's Rook [8]

Ayesha

The rook is represented with a piece having a hat, similar to a farmer's one. Since the piece represents a mid-range powerful character in the chess game, while still having its own importance to give the game a different dimension, it has similarities with the role of farmers in our society. The role of this profession is very important to a society and economy but yet sometimes, the role is overlooked. So with this design, the significance of farmers' roles was represented.

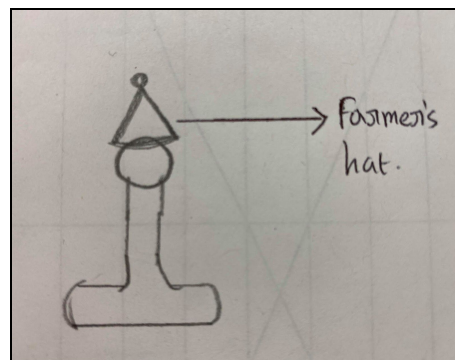


Figure 18: Ayesha's Rook

BISHOP

Damian

I have chosen to take the bishop piece quite literally and make it a bishop hat. It starts out cylindrical on the bottom and then about halfway up the front and back comes to points. I have also added a cross on the front that sticks out just a small amount.

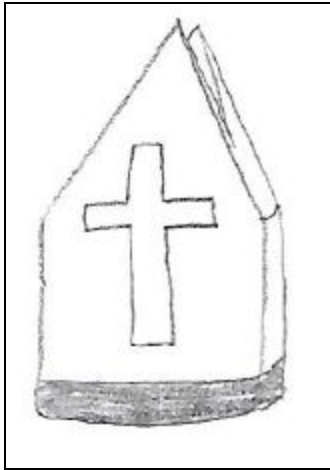


Figure 19: Damian's Bishop

Vladimir

The bishop will be a construction hat. It will be spherical in shape and will have three lines extruded going from the back of the hat to the front.

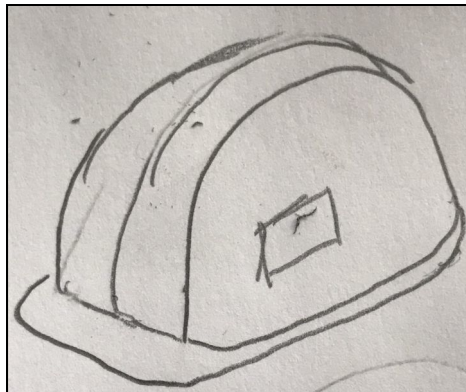


Figure 20: Vladimir's Bishop

Ashraf

The Bishop is designed from an Archbishop in the Middle Ages. The top of the hat is a cross. There are also crosses on the body which will help distinguish the Bishop from other pieces.



Figure 21: Ashraf's Bishop [3]

James

I have decided to use a tricorne hat for the bishop. It has three points in a triangle with a small ridge along it, and a section in the center where the head would go. It sits on a stand to bring it to the appropriate height and weight distribution, like all others in my design set.



Figure 22: James' Bishop

Wenzhi

There was barely any bishop in Chinese history, thus I chose the hat of prime minister in ancient China for this piece. The prime minister is the most powerful person in the whole country except for the king. A base will be rectangular-shaped with extrusion on the top, the patterns will also drawn onto the hat. A red transparent plastic will be glued on the front of the base to represent the jewelry.

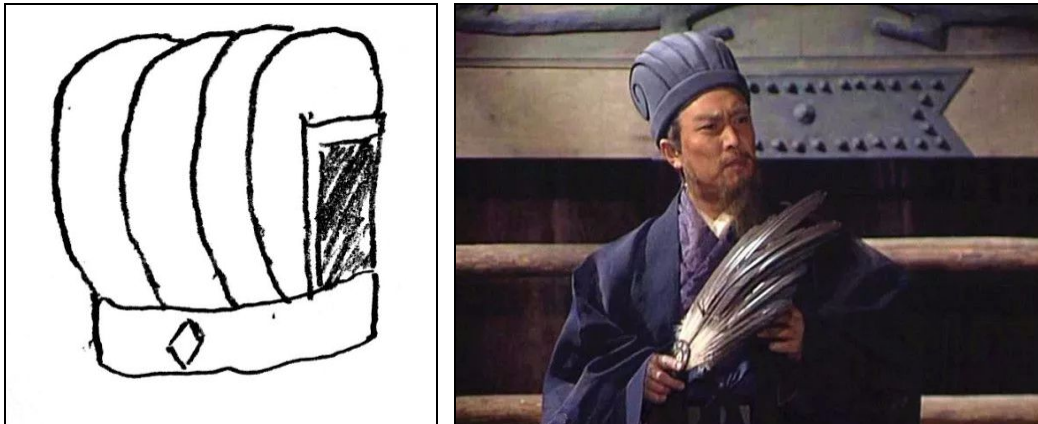


Figure 23: Wenzhi's Bishop [9]

Ayesha

The character was provided with a long hat, similar to a joker's hat. This is to put light on the importance of the people who seemingly have insignificant importance to a society, but actually are an important part in large. Also, the long slender look of the hat gives an extra dimension to be noticed easily, which represents the urge of neglected people in the society, to draw much needed attention.

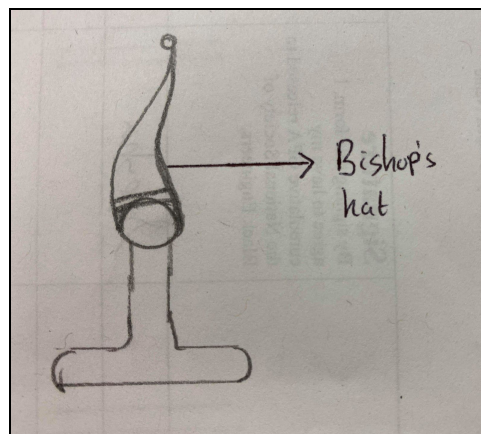


Figure 24: Ayesha's' Bishop

KNIGHT

Damian

I have chosen to make my knight a horse with a cowboy hat on it. The horse will be almost like the one in regular chess, but with a cowboy hat on it. The cowboy hat bends up on the two sides as well.

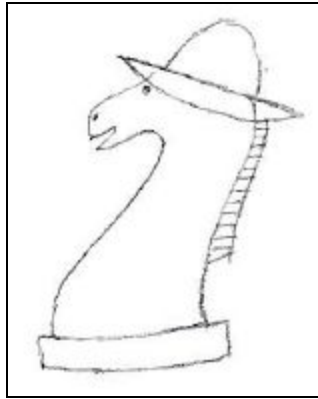


Figure 25: Damian's Knight

Vladimir

The knight will be a fireman's hat. It will be spherical in shape with an extruded brim surrounding the sphere. The brim will be larger in the back of the model.



Figure 26: Vladimir's Knight

Ashraf

The Knight of my chess set will represent a Knight from the Middle Ages. The Knight can be easily distinguished from other pieces by the protective helmet. The helmet extends down to the nose to protect the face. The protective armor is another distinguishable feature.

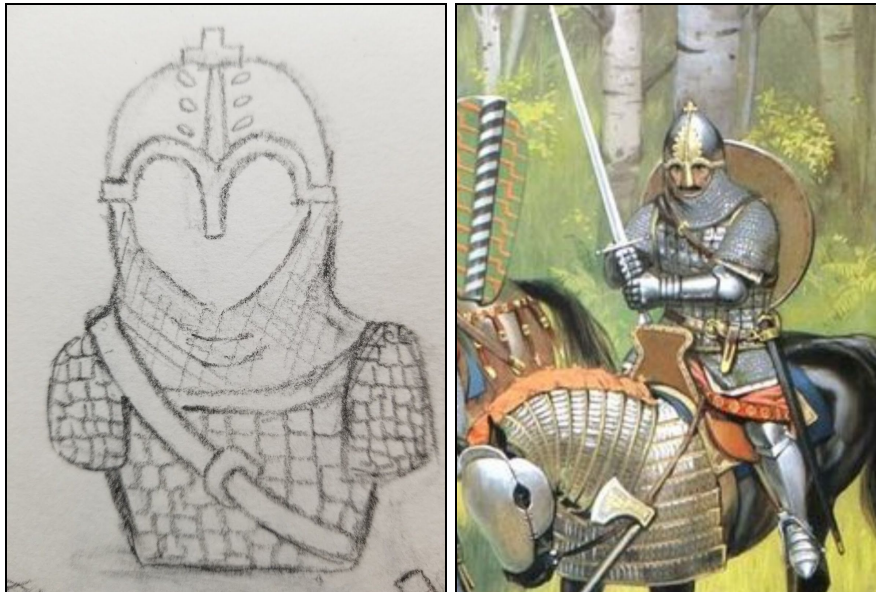


Figure 27: Ashraf's Knight [4]

James

I chose a jester's hat for the knight, in light of its unconventional movement. The jester's hat has two hanging points, and fits its entire base on the stand. It sits on a stand to bring it to the appropriate height and weight distribution, like all others in my design set.



Figure 28: James' Knight

Wenzhi

I chose the hairpin and decoration of noble in ancient China to represent the knight. This piece is usually made of gold to show their wealth and high position. Same as the design of the queen, a shell with thin patterns will represent the hair and the curve plates with patterns carved on them will be attached to the top of the hair. Then a pin will be attached to the plates. The whole piece of the hairpin and decoration can be painted gold.



Figure 29: Wenzhi's Knight [10]

Ayesha

The hat for Knight's character has a traditional cowboy hat, used by horse riders. The design represents the beauty of horse riding tradition and also the role of athletes in our society.

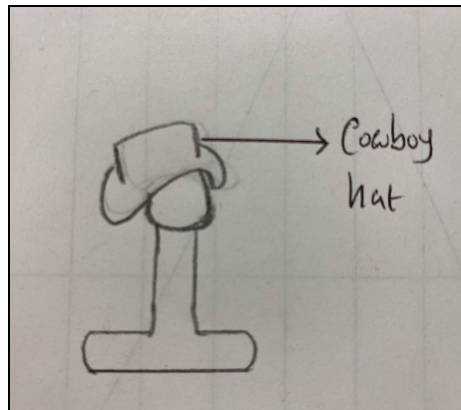


Figure 30: Ayesha's Knight

PAWN

Damian

I have chosen to make my pawn a miner hat. It is basically a construction hat, but with a lamp fixed to the front of it. There is also a strap that runs along the circumference that is to hold the lamp in place.

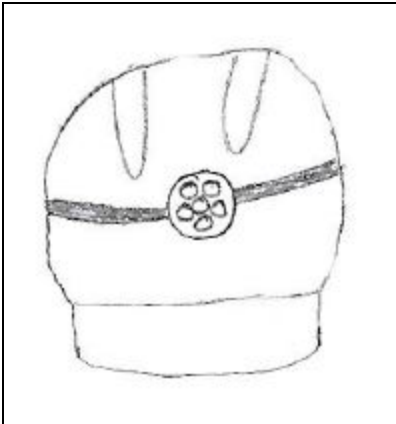


Figure 31: Damian's Pawn

Vladimir

The pawn will be a graduation cap. The pawn can change to any other piece once it reaches the end of the board, much like students choosing their careers at the end of college. The cap will be flat and have a base that connects to the board. There will be a tassel that extends off one side.

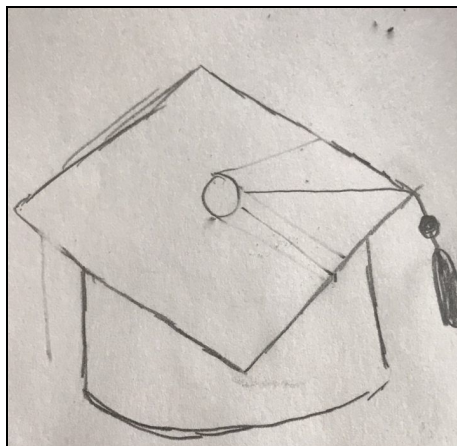


Figure 32: Vladimir's Pawn

Ashraf

The Pawn of my chess piece will be represented by a hat that soldiers used to wear during the Middle Ages in Europe. The shape of the hat is similar to a farmer's hat. This is a simple and easy to manufacture piece. The simple design will be beneficial economically since many of the pieces in a chess set includes Pawn.

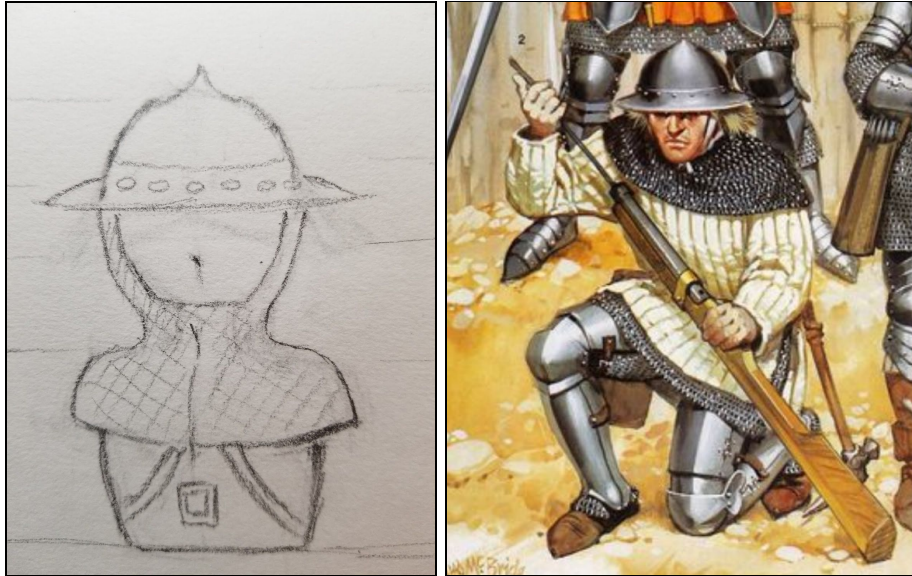


Figure 33: Ashraf's Pawn [5]

James

My pawn is a baseball cap. The brow of the cap hands over the edge of the stand, and the dome of the hat is simple. It sits on a stand to bring it to the appropriate height and weight distribution, like all others in my design set.



Figure 34: James' Pawn

Wenzhi

My design of the pawn is the helmet of ancient Chinese soldiers. A typical design of the helmet was a solid hemisphere metal with metal fins attached to the bottom to reduce the weight of the helmet. A hemisphere will be the whole helmet will be created in a whole piece, then on the bottom part, the shape of fins will be carved out and other patterns will be drawn.

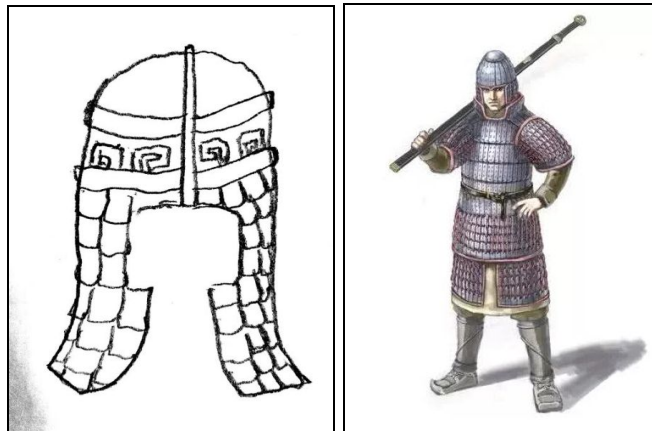


Figure 35: Wenzhi's Pawn [11]

Ayesha

The hat for this character was chosen to be similar to a modern day policeman's hat. The character itself works for providing shields to other characters in the game, which closely aligns with the role of police in society. So, a police hat appears to be a perfect fit to represent the pawn character in a chess game.

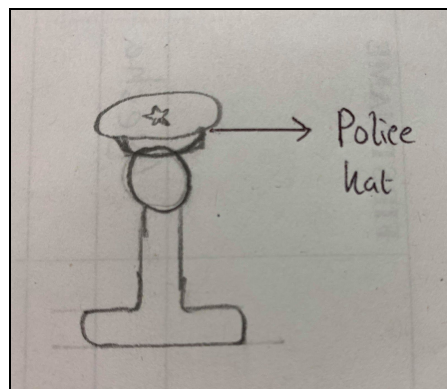


Figure 36: Ayesha's Pawn

MATERIALS

When creating this chess set it is important to consider the different materials that the pieces can be manufactured from. Different materials have different properties and manufacturing methods. By weighing out the pros and cons of each one it will become clearer which material should be chosen for our design.

One material to consider for our design is ABS plastic. The material is low cost and lightweight, which is perfect for a large production of our chess sets. Since the plastic is used in 3D printing, the pieces have an opportunity to have a high level of detail. This is determined by the machine itself and how thin the layers can be printed.

Another material to consider is wood. Wood is a little heavier than plastic so it would offer a good amount of feedback from the user when a piece is picked up. It also has a familiar texture and people are used to seeing this from day to day. Depending on the methods of manufacturing and the people working on the pieces the surface finish can alter drastically.

A third material that can be chosen is cast iron. Cast iron could offer a very rustic look to the chess set that could enhance the playing experience. However, this material is very heavy and could not be suitable for some players. Also, cast iron may begin to rust if it is not regularly maintained. Depending on the method used, such as casting, the surface finish can widely vary.

Finally the last material to be considered is stainless steel. This material will not rust when exposed to moisture and is also high strength. But, in bright locations the material could reflect light in an annoying way or the shape of the piece could be lost in the light. The manufacturing processes that could be used for these pieces allow for an excellent surface finish that would look very high quality.

DISTINGUISHING FEATURES

One way to easily distinguish pieces is by color. With this set varying heavily from traditional geometry, players should have the same shape pieces to prevent any confusion during the game. This makes the game intuitive, despite the large differences in our pieces. The color choices will be left to the designers of the sets. They should contrast each other heavily.

The design of each piece will be the distinguishing factor between the different pieces for one player. Each piece will have a different design that will allow for an enjoyable playing experience. We will consider this when choosing what pieces will become the final set. With the theme of hats, we can pick a different style hat for each piece and this would get rid of any ambiguity that players might encounter if all the pieces looked the same.

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