

## 9<sup>th</sup> - 12<sup>th</sup> Grade **STUDENT PLAYBOOK**

# **CREATIVE CODE**

Name

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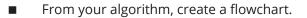
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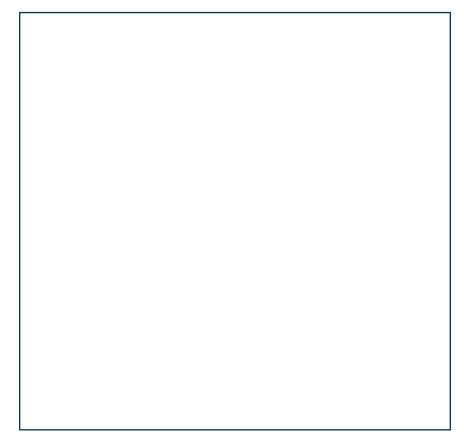
- Why are algorithms and step-by-step instructions important to computers?
- Did you know? In 1842, Ada Lovelace wrote a paper that laid the groundwork for today's computer programming. She is known as the first computer programmer.

### FIRST E 10

- When you enter the College Football Hall of Fame, you receive and register your All Access Pass. This allows the building to know who you are. The technology that allows this to happen is an RFID enabled badge. RFID stands for Radio Frequency Identification.
- An algorithm is a step by step analysis of a process. As you walk through the College Football Hall of Fame, develop an algorithm of all the activities that access your RFID enabled badge. Make sure you include the sequence of events, any selections that can be made and any iteration (repetition). Make note of any areas that might use recursion. Recursion is when you use a section of the program again. Do not include the code for the RFID reader.
- Write your algorithm here:

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#### **POST-GAME - KEEP EXPLORING!**

- Robots are programmed to complete many tasks. You could create an algorithm to impact someone's life.
- Think of someone you know who might be in need of a program. Maybe someone with special needs or an elderly person who might need help.
- Create an algorithm, flowchart and create code for this person.
  Use a language of your choice. You can use block coding like scratch or a compiled language like java or python.



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- How can a blimp be a useful tool for charities and nonprofits?
- Did you know? The cabin windows of a blimp can be opened so that passengers can lean out and wave to the people on the ground.

## FIRST E 10

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- Make your way to the Goodyear Blimp Experience located on the 2nd floor of the Hall.
- Take a moment to look around the airship. What do you notice? What is different from the inside of this exhibit and your car? A plane? A train?
- Next, sit in a seat and choose one of your favorite teams to view a video of the Goodyear Blimp flyover of their stadium. As you watch the flyover, think about the following questions:
  - How is this perspective different than from inside the stadium? Can you see more or less? How does it change your experience or understanding of the field or the stadium?
- The perspective that the blimp is filming from is often referred to as a "bird's eye view". As the name indicates, it refers to the way that a bird would see things as it flies over.
- While the ability of the blimp to offer this perspective to viewers is important, most blimps also display messages or images that are important for the viewers to see as well. Blimps did not always serve as marketing devices, however. Check out some highlights from the history of the blimp below:
  - □ The first balloon, or blimp, was created in 1912.
  - In the 1920's, Goodyear blimps began appearing across America, making it a recognizable presence. However, they were not being created solely for people to enjoy looking at – they were being groomed as military vehicles for the Navy.

- From 1930-1940, Goodyear blimps began carrying lighted signs to display messages as well as loudspeakers to "blimpcast' live greetings to the public below.
- During World War II, blimps were an important part of the Navy's convoy due to their ability to stay airborne for long periods of time and monitor the seas.
- □ After the war, however, their focus was lighting the skies with flying signage.
- From 1955 the present, Goodyear blimps have evolved in their ability to display signage from large bulbs only capable of one color, to screens that can display a variety of images, colors and logos.
- Goodyear Blimps are now very familiar sites at most sporting events – especially football games – and are known for their dedication to advertising for nonprofits and helping raise money for various charities. This is a source of pride for the company and they continue to engage in helping charitable organizations.
- One of the ways the blimps raise funds is to ask viewers to text a phrase to a number in order to donate to a specific cause. Many philanthropic endeavors have benefited from this type of promotion.
- Additionally, the signage from the blimp has been used to offer helpful messages to people who are stuck in dangerous weather conditions.
- Across the years, Goodyear Blimps have served many important purposes and continue to support those in need in various ways.

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- Use the next page to create a drawing of a blimp design. In your design, think about how you would use the blimp to help others in the way that Goodyear has used theirs to aid the Navy, nonprofits and people trapped in dangerous weather conditions.
- The Goodyear Blimp is an iconic symbol, and its silver color with the Goodyear logo has become highly recognizable all over the United States as well as other parts of the world.
- In your design, think about things such as color, shape, and marketing abilities. What distinctive characteristics would your blimp have? Why would those characteristics be successful? What about the inside? Is the appearance of the interior important? If so, why?
- Once you have created your design, think about ways that you could use your blimp to help others or benefit your community in some way. Would you use it to raise money? What sorts of organizations would you support? Write a brief description that addresses these questions next to your design.

#### **POST-GAME - KEEP EXPLORING!**

Whether soaring through the air or plunging to great ocean depths, blimp pilots and submarine pilots have a lot to keep up with on the job. Steering either vehicle requires special training and licensing.



- What do blimps and submarines have in common?
- In what ways are they different?

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Grades 9-12



## **PUT A LID ON IT** The Science of Helmet Design

- What is the purpose of wearing a helmet?
- What design features make a helmet effective?
- How does a helmet mimic structures found in nature?

## FIRST E 10

Proceed to The Evolution of Equipment on the 2nd floor.

#### HEADFIRST

Did you know? Your brain is a powerful machine that controls every move you make, every thought you have, every word you speak. Messages are sent from the brain throughout the body, informing every organ, tissue, and cell to do what it commands. While our brains are encased in the collection of bones known as the skull, football players wear helmets to provide additional protection.

How do you think helmets protect the brain?

#### **MAKING AN IMPACT**

Did you know? Certain materials are better at absorbing impacts than others. Think about dropping a basketball on a hard court. What happens? It probably bounces. Now think about dropping the same basketball on a stack of pillows. What happens? Not the same reaction as on the court!

Look at the helmets in the display case. Why do you think the designers used different materials for the inside of the helmets compared to the outside?

#### THE EVOLUTION OF FOOTBALL HELMETS

Did you know? Helmets have radically evolved since the late 1880s. Designers, medical professionals, and physicists continue to explore how to improve upon even the most modern versions.

Imagine you are asked to develop a brand new football helmet for a major company with endless resources (read: money!). With an unlimited budget, how would you test your design before testing on a real person?

#### LET'S GET WILD!

- Did you know? Biomimicry is the design of a structure or system based on what is observed in nature.
   Example: Early airplanes were modeled after birds in flight!
- Other than helmets, what part of a football player's gear or uniform may have been inspired by something in nature? Why do you think so?

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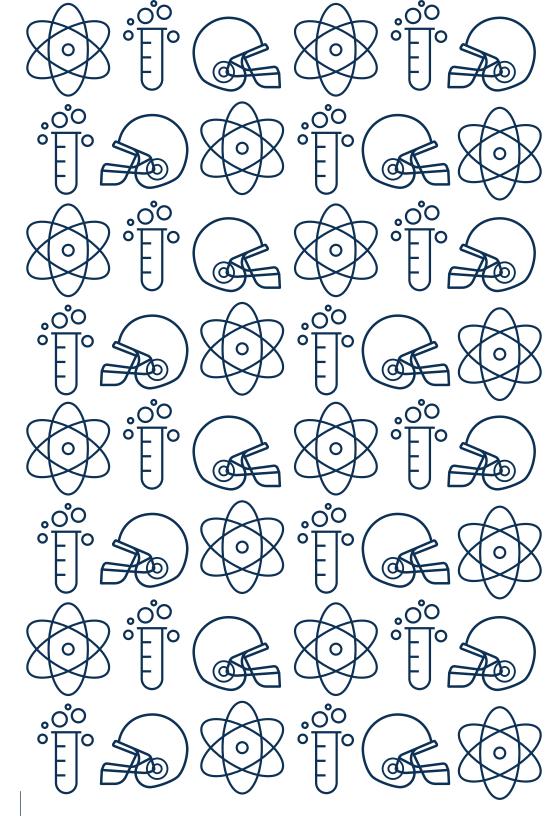
Grades 9-12

## **POST-GAME - KEEP EXPLORING!**

Football players will sometimes have stickers or decals on their helmets that they wear during games. Those stickers aren't just for decoration – they usually have a special meaning. For some players, the stickers represent individual or team accomplishments. Other times, they represent a cause the player might feel strongly about. Without knowing the player, viewers are able to understand something about them through the stickers.

If you were going to be in front of hundreds of viewers, what would you want them to know about you by looking at the stickers on your helmet? Draw a helmet complete with the images that you would want on it while playing on the field. Ask your friends or family to do the same and compare what each of you chose to add to your helmets. And, the next time that you watch a football game, look to see if any of the players have stickers on their helmets and try to guess what they might represent!







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LEFTIES

## **RIGHTIES VS.** VR FOOTBALL EXPERIENCE

The U.S. Air Force presents an immersive, fully responsive QB simulator that puts you in the middle of the game to see if you have what it takes to get the ball to your wide receiver before you get sacked!

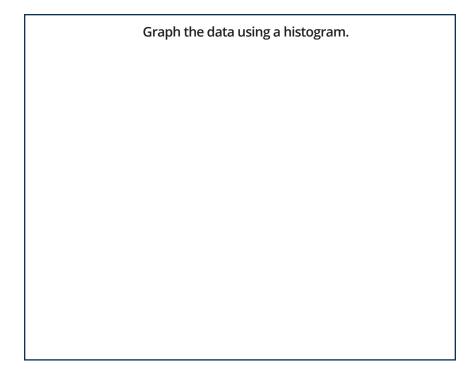


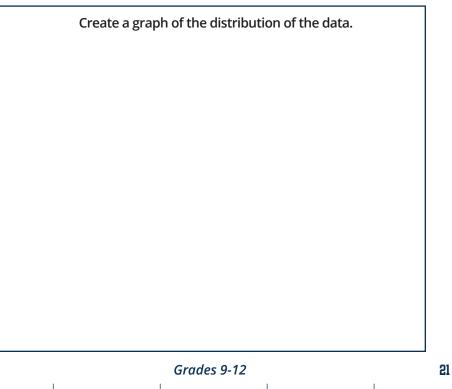
- Are there differences between right handed and left handed people?
- Did you know? 5 of the last 11 presidents were left handed.
  Other famous left handed people include Lady Gaga, Leonardo da Vinci, Bill Gates, Tim Tebow, Justin Bieber and Steve Young.

### FIRST E 10

- Make your way to the Air Force Air Raid on the 2nd floor of the College Football Hall of Fame. This is an AI (Artificial Intelligence) system that is used by college teams, so you will experience how some players prepare for games.
- Sign up to participate in the Air Force Air Raid Experience.
- While you are waiting your turn, watch others play and make tally marks for each player in the following table.
  - □ If the ball is thrown near the center, it would be close to a right angle.
  - □ If the ball is thrown to the left, it would be an acute angle.
  - □ If the ball is thrown to the right, it would be an obtuse angle.

Right handed	
Left handed	
Right angle (center)	
Acute angle (to the left)	
Obtuse angle (to the right)	





- Add the right handed and left handed people together to get the total number of people.
- Use that and the tally marks from your table to find the following.
- Find the ratio of people that were right handed.
- Find the ratio of people that were left handed.
- In a complete sentence, explain the spread of distribution.

What can you infer about left and right handed people from the data you collected?

What hypothesis can you make from the data you collected?

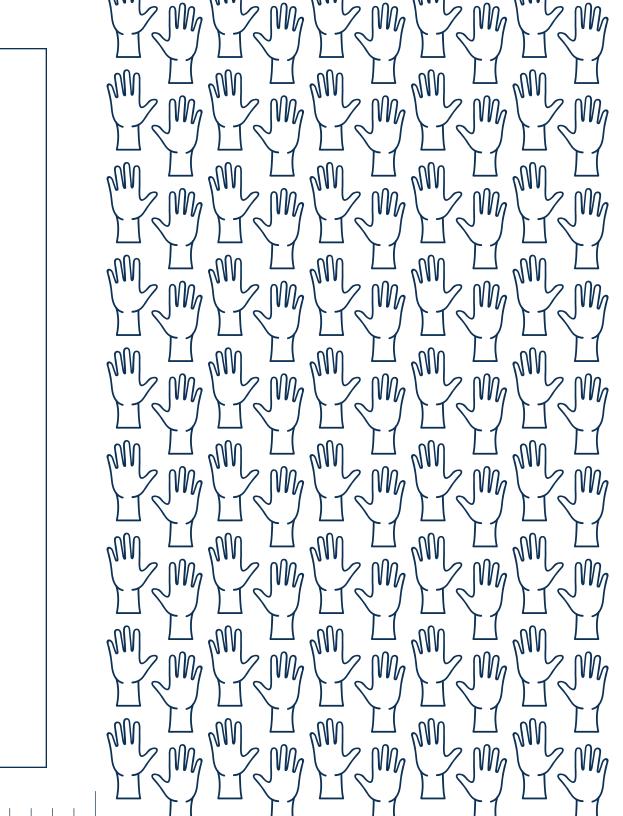
Explain your findings using a ratio relationship.

- Were there more right handed or left handed people?
- What percentage of this population is left handed?
- Was the ball thrown more to the left, right or center?
- Why do you think it was thrown more in that direction?
- What are the patterns you notice?
- What outliers do you notice?

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#### **POST-GAME - KEEP EXPLORING!**

Have you ever tried to do a task with your non-dominant hand? On a piece of paper, draw an object with your dominant hand. Then, draw the same object with your non-dominant hand. Work up to larger drawings. Although it is much harder with your non-dominant hand, sometimes you can unintentionally create some very interesting lines and shapes.



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■ How do various types of exercise impact your body's systems?

#### FIRST E 10 WARM UP

- Find the Kia Performance Challenge on the 2nd floor.
- Did you know? Sure, it might be fun to slam down on a car's accelerator to go from 0 to 60 mph in 3 seconds like Dom in *The Fast & The Furious*, but it puts significant stress on the transmission. Similarly, when you start exercising really hard without first warming up, you put stress on your body, especially your heart and other muscles.
- In what other ways is taking care of your body like taking care of a car?

Perform the Vertical Jump twice. For Jump 1, do not squat down at all: just jump from your normal standing position. For Jump 2, squat far down to the ground. In the table below, record your heights then calculate the difference.

Jump 1	Jump 2	Difference
Inches	Inches	Inches

#### **NO SWEAT**

- Did you know? Most modern athletic clothing is made of sweat-wicking fabric. While cotton absorbs moisture, it stays wet for a long time. Sweat-wicking fabrics like nylon and polyester allow moisture to evaporate quickly.
- Besides fabric, what are other elements a designer should consider when developing athletic clothing?

#### **JUMPING AHEAD**

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Did you know? Have you ever used a slingshot? The further back you pull the elastic, the greater the distance your missile will fly. This mechanical principle is a lot like jumping from a standing position. The lower to the ground you squat, the higher you'll jump.



#### **POST-GAME - KEEP EXPLORING!**

- A shoe engineer is a person whose job is to design the optimum athletic shoe.
- If you were to design an athletic shoe, what would be the most important things to consider?
- What types of materials would you use?

Grades 9-12



- What characteristics and strengths would it take to create the ultimate football player – one who could qualify for the College Football Hall of Fame with stats from multiple positions?
- Did you know? Currently, there is only one father and son in the College Football Hall of Fame. Archie Manning (Mississippi) and his son Peyton Manning (Tennessee).

#### FIRST E 10

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- Make your way to the 3rd Floor of the Hall. There you will find the name of every player and coach that has been inducted into the Hall of Fame. Additionally, there are twelve touchscreen stations where you can look up all of the Hall of Fame players and coaches to find in depth stories, videos and stats.
- Take a moment to glance through the names on the wall. These are the best of the best – the elite few that have been chosen from millions of players to represent the top tier. What do you think it takes to be inducted into such an elite group of athletes?
- Those that are chosen to be inducted into the College Football Hall of Fame must meet specific guidelines before even being considered. They include:
  - A player must have received First Team All-America recognition by a selector organization that is recognized by the NCAA and utilized to comprise their consensus All-America teams.
  - 2. A player becomes eligible for consideration after their final year of intercollegiate football.

- 3. While each nominee's football achievements in college are of prime consideration, their post football record as a citizen is also weighed. They must have proven themselves worthy as a citizen, carrying the ideals of football forward into their relations with their community. Consideration may also be given for academic honors and whether the candidate earned a college degree.
- 4. Players must have played their last year of intercollegiate football within the last 50 years. In addition, players and coaches who are participating on the professional level are not eligible until after they retire.
- 5. A coach becomes eligible three years after retirement, or immediately following retirement provided they are at least 70 years of age. Active coaches become eligible at 75 years of age. They must have been a head coach for a minimum of 10 years and coached at least 100 games with a .600 winning percentage.
- Now that you know the qualifications, take time to look through some of the players' information on the touch screens. Choose your favorite team and find the inductees from that team. What positions did they play? What do they have in common? How are they different?
- On the following pages, you will create the "ultimate" football player. This player will have all the strengths and characteristics that it takes to play the following positions at a level that would meet the standards for the Hall of Fame.

Grades 9-12

**Quarterback:** As the leader of the team, the quarterback decides what plays will be called and signals the plays to the other players. After receiving the ball from the center, they either hand off the ball to the running back, throw it to a receiver or run with the ball. Important attributes for a quarterback include the ability to throw the ball far and accurately, as well as think on their feet and react quickly when a play doesn't go as planned.

**Running Back:** This player's job is to run with the football toward the end zone to score a touchdown. Running backs are also referred to as tailbacks, halfbacks and rushers. A running back needs to be able to run fast and maneuver quickly to dodge tackles.

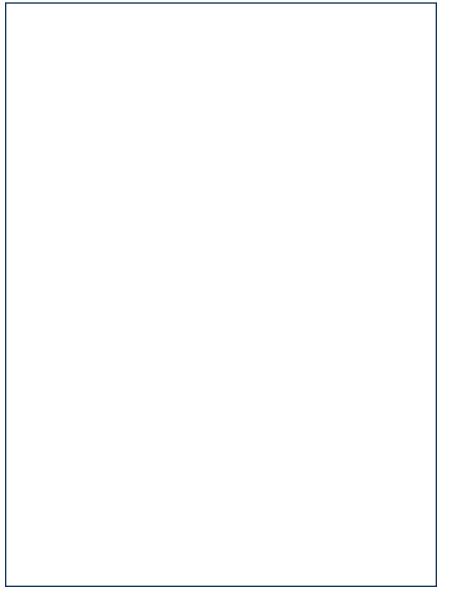
**Wide Receiver:** The successful wide receiver moves quickly past defenders to catch the football and run as far as possible toward the end zone. Wide receivers must have good hands to catch the passes thrown to them by the quarterback and speed to elude defenders.

**Defensive Lineman:** The main job of the defensive lineman is to keep the other team from scoring. Depending on their position in the line, they work to overcome offensive blocking, pressure the opposing team's quarterback, disrupt the offense's backfield formation, and stop running plays by tacking the ball carrier or pushing them out-of-bounds. Linemen need to be big, strong and powerful.

**Linebacker:** Linebackers can have a wide range of duties as they defend against both running and passing plays. They are required to be all-around athletes with strength and speed so they can stop ball carriers, chase down the opponent's quarterback, and cover fast-running wide receivers.

**Secondary:** Players in the secondary defense such as the safety and cornerback provide the last line of defense against the opposing team's end zone. Positioned deep and wide on the field, defensive backs must be fast, tough and outstanding tacklers.

On the next page, draw your "ultimate" football player who could dominate the six positions above. What physical qualities would they need to have? What about characteristics that you can't see, but should possess? Once you have drawn your player, write out the characteristics and qualities that your player has. Then, write 1-2 sentences explaining how those qualities would come together to create the ultimate football player. Don't forget to describe the type of person that they are, because in order to be in the Hall of Fame, players must also have a proven record of being a good citizen both on and off the field.

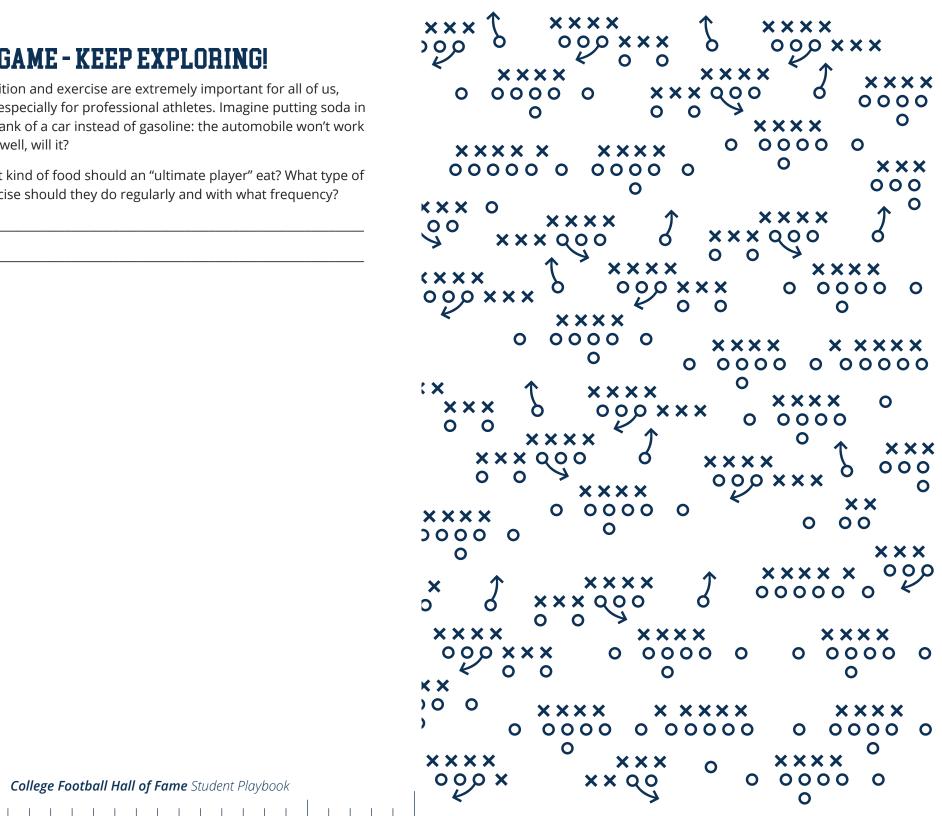


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## **POST-GAME - KEEP EXPLORING!**

- Nutrition and exercise are extremely important for all of us, and especially for professional athletes. Imagine putting soda in the tank of a car instead of gasoline: the automobile won't work very well, will it?
- What kind of food should an "ultimate player" eat? What type of exercise should they do regularly and with what frequency?



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## NOTES, THOUGHTS & SKETCHES

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