**HOMEWORK 4 – Inheritance (Advanced Classes)**

Answer the following questions. **THIS ASSIGNMENT WILL BE DUE AT A DATE TO BE ANNOUNCED IN CLASS.**  (100 points)

1. Define a class named FootballPlayer that has 4 attributes: firstName (a string), lastName (also a string), weight (in decimal pounds), and uniform number (an integer). Then derive from this class two other classes: Quarterback and RunningBack. The Quarterback class will be the class that you defined in Homework 2. The RunningBack class should add the following attributes: attempts, yards, and touchdowns. Each class should have appropriate accessor functions. Test the program by enabling the user to enter data for a lineman (a generic FootballPlayer), a Quarterback, and a RunningBack, then display this information.

**EXTRA CREDIT!!!** We did not cover the topic of nested classes. However, if you wish to do some research into the topic … add a fifth component to FootballPlayer: height, which should be a type Dimension that we defined in class. Add it to the list of items that the user inputs and that are printed as output.

class FootballPlayer:

class Dimension:

def \_\_init\_\_(self, feet, inches):

self.feet = feet

self.inches = inches

def \_\_str\_\_(self):

return f"{self.feet}'{self.inches}"

def \_\_init\_\_(self, first\_name, last\_name, weight, uniform\_number, height):

self.first\_name = first\_name

self.last\_name = last\_name

self.weight = weight

self.uniform\_number = uniform\_number

self.height = height

def get\_first\_name(self):

return self.first\_name

def get\_last\_name(self):

return self.last\_name

def get\_weight(self):

return self.weight

def get\_uniform\_number(self):

return self.uniform\_number

def get\_height(self):

return self.height

class Quarterback(FootballPlayer):

def \_\_init\_\_(self, first\_name, last\_name, weight, uniform\_number, height, att, com, yd, td, interceptions):

super().\_\_init\_\_(first\_name, last\_name, weight, uniform\_number, height)

self.att = att

self.com = com

self.yd = yd

self.td = td

self.interceptions = interceptions

def calculate\_qr(self):

if self.com > self.att:

return None

if self.td > self.com:

return None

if self.interceptions > self.att:

return None

if self.com + self.interceptions > self.att:

return None

if self.yd > 99 \* self.com:

return None

if self.yd < -20 \* self.com:

return None

term1 = (self.com / self.att \* 100 - 30) / 20

if term1 > 2.375:

term1 = 2.375

elif term1 < 0:

term1 = 0

term2 = (self.yd / self.att - 3) / 4

if term2 > 2.375:

term2 = 2.375

elif term2 < 0:

term2 = 0

term3 = (self.td / self.att \* 100) / 5

if term3 > 2.375:

term3 = 2.375

elif term3 < 0:

term3 = 0

term4 = (9.5 - (self.interceptions / self.att \* 100)) / 4

if term4 > 2.375:

term4 = 2.375

elif term4 < 0:

term4 = 0

qr = 100 \* (term1 + term2 + term3 + term4) / 6

return round(qr, 1)

def get\_qr(self):

print(f"Rating: {self.calculate\_qr()}")

class RunningBack(FootballPlayer):

def \_\_init\_\_(self, first\_name, last\_name, weight, uniform\_number, height, attempts, yards, touchdowns):

super().\_\_init\_\_(first\_name, last\_name, weight, uniform\_number, height)

self.attempts = attempts

self.yards = yards

self.touchdowns = touchdowns

def get\_attempts(self):

return self.attempts

def get\_yards(self):

return self.yards

def get\_touchdowns(self):

return self.touchdowns

def main():

# Football Player

first\_name = input("Enter the football player's first name: ")

last\_name = input("Enter the football player's last name: ")

weight = float(input("Enter the football player's weight (in pounds): "))

uniform\_number = int(input("Enter the football player's uniform number: "))

height = FootballPlayer.Dimension(input("Enter height (feet): "), input("Enter height (inches): "))

football\_player = FootballPlayer(first\_name, last\_name, weight, uniform\_number, height)

# Quarterback

first\_name = input("Enter the quarterback's first name: ")

last\_name = input("Enter the quarterback's last name: ")

weight = float(input("Enter the quarterback's weight (in pounds): "))

uniform\_number = int(input("Enter the quarterback's uniform number: "))

height = FootballPlayer.Dimension(input("Enter height (feet): "), input("Enter height (inches): "))

att = int(input("Enter the quarterback's attempts: "))

com = int(input("Enter the quarterback's completions: "))

yd = int(input("Enter the quarterback's yards: "))

td = int(input("Enter the quarterback's touchdowns: "))

interceptions = int(input("Enter the quarterback's interceptions: "))

quarterback = Quarterback(first\_name, last\_name, weight, uniform\_number, height, att, com, yd, td, interceptions)

# Running Back

first\_name = input("Enter the running back's first name: ")

last\_name = input("Enter the running back's last name: ")

weight = float(input("Enter the running back's weight (in pounds): "))

uniform\_number = int(input("Enter the running back's uniform number: "))

height = FootballPlayer.Dimension(input("Enter height (feet): "), input("Enter height (inches): "))

attempts = int(input("Enter the running back's attempts: "))

yards = int(input("Enter the running back's yards: "))

touchdowns = int(input("Enter the running back's touchdowns: "))

running\_back = RunningBack(first\_name, last\_name, weight, uniform\_number, height, attempts, yards, touchdowns)

# Display information

print()

print("Football Player:")

print()

print("Name:", football\_player.first\_name, football\_player.last\_name)

print("Weight:", football\_player.weight, "pounds")

print("Uniform Number:", football\_player.uniform\_number)

print("Height:", football\_player.height)

print()

print("Quarterback:")

print()

print("Name:", quarterback.first\_name, quarterback.last\_name)

print("Weight:", quarterback.weight, "pounds")

print("Uniform Number:", quarterback.uniform\_number)

print("Height:", quarterback.height)

quarterback.get\_qr()

print()

print("Running Back:")

print()

print("Name:", running\_back.first\_name, running\_back.last\_name)

print("Weight:", running\_back.weight, "pounds")

print("Uniform Number:", running\_back.uniform\_number)

print("Height:", running\_back.height)

print("Attempts:", running\_back.attempts)

print("Yards:", running\_back.yards)

print("Touchdowns:", running\_back.touchdowns)

if \_\_name\_\_ == '\_\_main\_\_':

main()