Program 6: Inheritance/Polymorphism

In this program you will make modifications to your solution to Program 4.   If you missed anything on Program 4 you must make corrections before starting this Program.
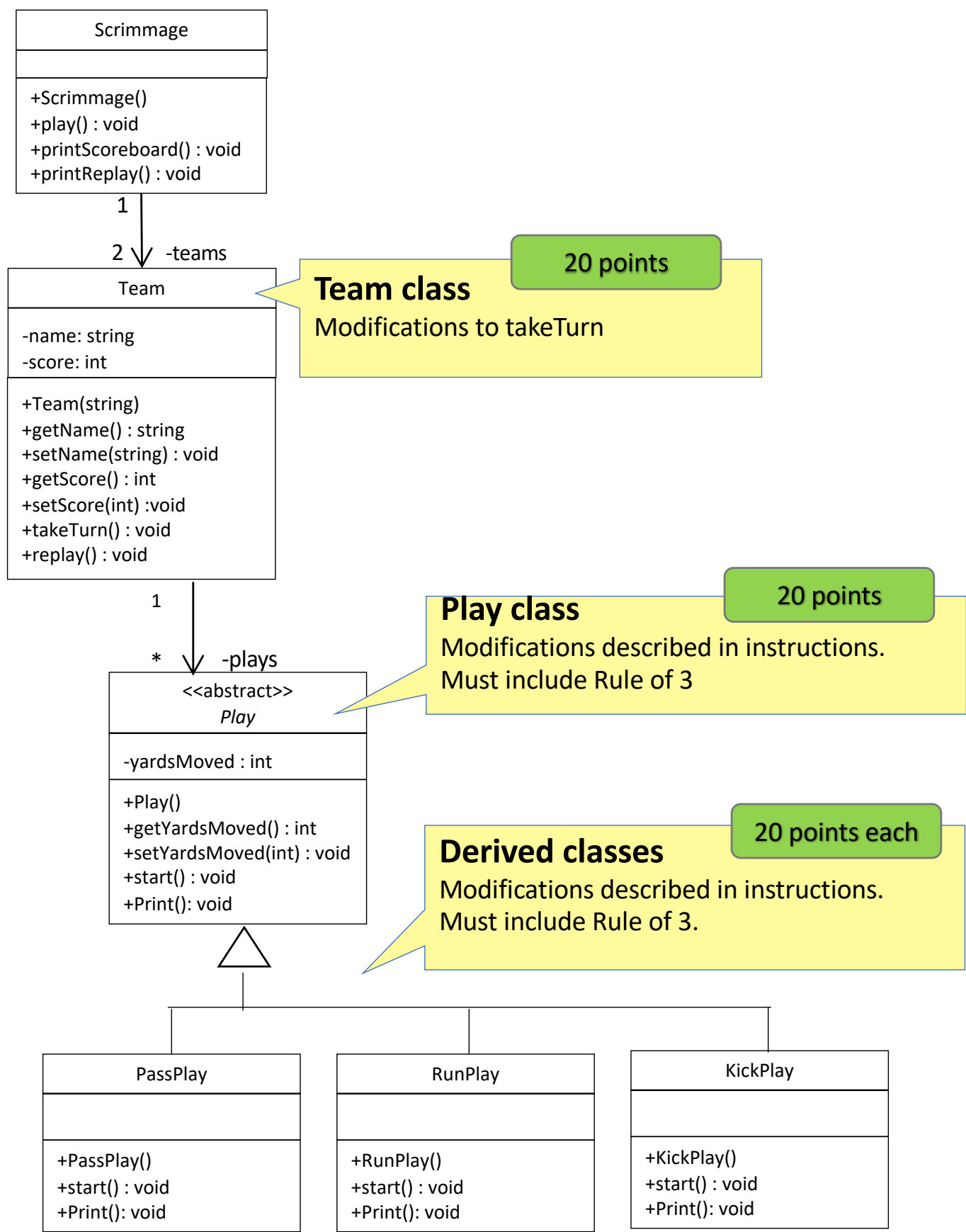
Program Changes:
- In addition to choosing Pass or Run, a Team may also choose to Kick a field goal. This option should only be offered when they have reached the 70 yard mark or greater.
  - A Kick has a 50% chance of success.
  - A successful Kick adds 3 points to the Team's score.
  - The Team's turn ends after a Kick, whether successful or not.
- Make the following design change to support inheritance/polymorphism:
  - Add three derived classes to Play: KickPlay, RunPlay, and PassPlay
  - Each of these derived classes must override the start() and Print() functions to implement polymorphism.
  - Remove the "playType" data member from Play as well as its getter and setter functions.
  - Remove the pass() and run() functions from Play and move it into the start() function of each of the three subclasses.
  - Add the new Kick game logic in its start() function
  - In Team's takeTurn() function, prompt for "Pass/Run/Kick" if the location is >= 70 yard line. Based on the user's choice, create a corresponding object of one of the classes: Pass, Run, or Kick and add it to the plays vector.
  - Override the Print() function in each of the derived classes which prints a message stating the type of Play and number of yards.   For Kick, instead of printing the number of yards, print whether or not the kick was successful.

  NOTE: You must put all objects and data members on the heap, and must include the Rule of 3 functions for the three derived classes.

The lab is due May 1, 2023 at 6:00am CST

Program Design

Scrimmage

+Scrimmage()
+play() : void
+printScoreboard() : void
+printReplay() : void

1

2 -teams

Team

-name: string
-score: int

+Team(string)
+getName() : string
+setName(string) : void
+getScore() : int
+setScore(int) :void
+takeTurn() : void
+replay() : void

20 points

Team class
Modifications to takeTurn

1

* -plays

<>
Play

-yardsMoved : int

+Play()
+getYardsMoved() : int
+setYardsMoved(int) : void
+start() : void
+Print(): void

20 points

Play class
Modifications described in instructions.
Must include Rule of 3

20 points each

Derived classes
Modifications described in instructions.
Must include Rule of 3.

PassPlay

+PassPlay()
+start() : void
+Print(): void

RunPlay

+RunPlay()
+start() : void
+Print(): void

KickPlay

+KickPlay()
+start() : void
+Print(): void

Partial Sample Output

```
Enter name for team #1: Titans
Enter name for team #2: Cowboys
Titans's turn
   Ball at: 20.    Down #1
   Run or Pass(R/P)? p
   Moved back 5 yards
   15 yards to 1st down
   Ball at: 15.    Down #2
   Run or Pass(R/P)? p
   Moved 10 yards
   5 yards to 1st down
   Ball at: 25.    Down #3
   Run or Pass(R/P)? p
   Moved 30 yards
   10 yards to 1st down
   Ball at: 55.    Down #1
   Run or Pass(R/P)? p
   Moved 15 yards
   10 yards to 1st down
   Ball at: 70.    Down #1
   Run, Pass or Kick (R/P/K)? k
Kick no good.
Turn over
SCOREBOARD
0      Titans
0      Cowboys
Cowboys's turn
   Ball at: 20.    Down #1
   Run or Pass(R/P)? p
   No yards
   10 yards to 1st down
   Ball at: 20.    Down #2
   Run or Pass(R/P)? p
   Moved 30 yards
   10 yards to 1st down
   Ball at: 50.    Down #1
   Run or Pass(R/P)? p
   Moved 15 yards
   10 yards to 1st down
   Ball at: 65.    Down #1
   Run or Pass(R/P)? p
   Moved back 10 yards
   20 yards to 1st down
   Ball at: 55.    Down #2
   Run or Pass(R/P)? p
   Moved 20 yards
   10 yards to 1st down
   Ball at: 75.    Down #1
   Run, Pass or Kick (R/P/K)? K
Kick good for 3 Points!
Turn over
SCOREBOARD
0      Titans
3      Cowboys
```

```
Titans's turn
   Ball at: 20.    Down #1
   Run or Pass(R/P)? R
   No yards
   10 yards to 1st down
   Ball at: 20.    Down #2
   Run or Pass(R/P)? p
   Moved back 10 yards
   20 yards to 1st down
   Ball at: 10.    Down #3
   Run or Pass(R/P)? p
   Moved 20 yards
   10 yards to 1st down
   Ball at: 30.    Down #1
   Run or Pass(R/P)? R
   Moved 5 yards
   5 yards to 1st down
   Ball at: 35.    Down #2
   Run or Pass(R/P)? p
   Moved back 5 yards
   10 yards to 1st down
   Ball at: 30.    Down #3
   Run or Pass(R/P)? p
   Moved 10 yards
   10 yards to 1st down
   Ball at: 40.    Down #1
   Run or Pass(R/P)? p
   Moved 30 yards
   10 yards to 1st down
   Ball at: 70.    Down #1
   Run, Pass or Kick (R/P/K)? K
Kick no good.
Turn over
SCOREBOARD
0      Titans
3      Cowboys
```

```
Cowboys's turn
   Ball at: 20.    Down #1
   Run or Pass(R/P)? p
   Moved 20 yards
   10 yards to 1st down
   Ball at: 40.    Down #1
   Run or Pass(R/P)? p
   Moved 20 yards
   10 yards to 1st down
   Ball at: 60.    Down #1
   Run or Pass(R/P)? R
   Moved 5 yards
   5 yards to 1st down
   Ball at: 65.    Down #2
   Run or Pass(R/P)? p
   Moved back 5 yards
   10 yards to 1st down
   Ball at: 60.    Down #3
   Run or Pass(R/P)? p
   Moved 10 yards
   10 yards to 1st down
   Ball at: 70.    Down #1
   Run, Pass or Kick (R/P/K)? k
Kick good for 3 Points!
Turn over
SCOREBOARD
0      Titans
6      Cowboys
```

Etc...