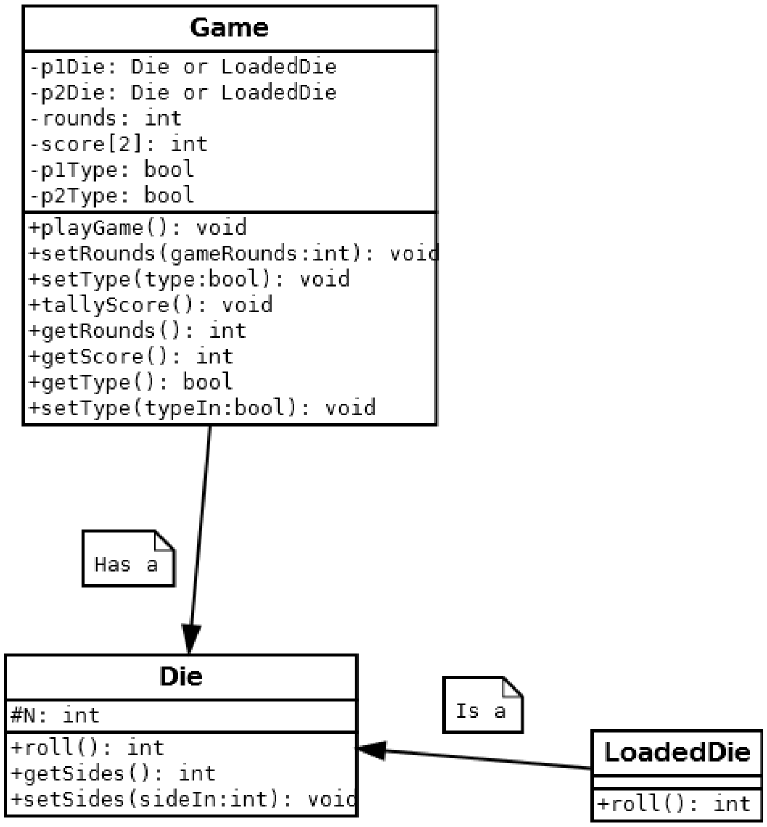
Justin Hammel
CS 162
Spring 2017
Lab 2 Design Plan

1. Define what the program is to do.
   a. Purpose: Play a game of war using dice between two players.
   b. Input: die sides per player, loaded die or not for each player, number of rounds to play
   c. Output: menu for playing the game, after menu options selected output the results of the game indicating sides and type (loaded/normal) of die, results of each player's roll per round, and final winner of the game
2. Model the program
   - Program starts displaying menu for the game,
     - Menu options are start game, setup player 1 die, setup player 2 die, set number of rounds, or exit
   - Setup player 1 die selected
     - prompts user to enter die size for player 1, p1DieSize
     - Prompt user to enter type of die for player 1, p1Type
     - Create p1Die object
       - If p1Type == true then create LoadedDie instead of Die object
   - Setup player 1 die selected
     - Prompt user to enter die size for player 2, p2DieSize
     - Prompt user to enter type of die for player 2, p2Type
     - Create p2Die object
       - If p1Type == true then create LoadedDie instead of Die object
   - Set number of rounds selected
     - Prompt user to enter rounds to play, gameRounds
   - Start game selected
     - Use get functions (getRounds, getSides) to validate that parameters for game are set up prior to running
     - Use Game class to create game object, currentGame
     - Output the sides and type of each players dice
     - playGame method passed number of rounds and controls game
       - loop until required number of rounds go by
       - roll each die once per round using regular or loaded function based on bool type of die
         - loaded function fills array with values corresponding to possible die rolls, plus an extra entry for each of the values that are greater than the mean die roll
         - random number generator returns value corresponding to the possible index spots of the array
         - regular roll function returns random value based purely on the available results from diedie
       - output the results of each roll to the screen each round
       - increment counter to control game loop
       - use tallyScore method to adjust score based on die roll
         - if p1 wins add 1 to score[0]
         - if p2 wins add 1 to score[1]

      - if draw, no score added
    - at end of the game output winner based on score[]
      - if score[0] > score[1] p1 wins
      - if score[1] > score[0] p2 wins
      - else game is a draw
- After game is complete return to the main menu

3. Class hierarchy diagram



4. Testing Plan

TEST	INPUT VALUES	DRIVER FUNCTIONS	EXPECTED RESULTS	OBSERVED OUTCOMES

No input1	None	main()
		while getRounds, getSides ==0
			Testing input validation to prevent game from running with no data	

Integer input validation	spaces “asdf” 1234asdf	main() InputValidation function	When creating Die object, or setting rounds from main menu should loop until valid integer input received.	

scoreTally test	5 rounds with same types of dice
	both fair 4 sided
	both fair 6 sided
	fair 4 sided vs fair 10 sided
		main()
		playGame()
		roll()
		tallyScore()
			Should have proper output in the event of either player winning, or a draw.	

Loaded roll output	15 rounds with loaded and regular 6 sided dice	main()
		playGame()
		roll()
		LoadedDie roll()
			Expect to be able to see divergent averages between loaded and regular roll showing a bias toward	

		the numbers greater than the average.	