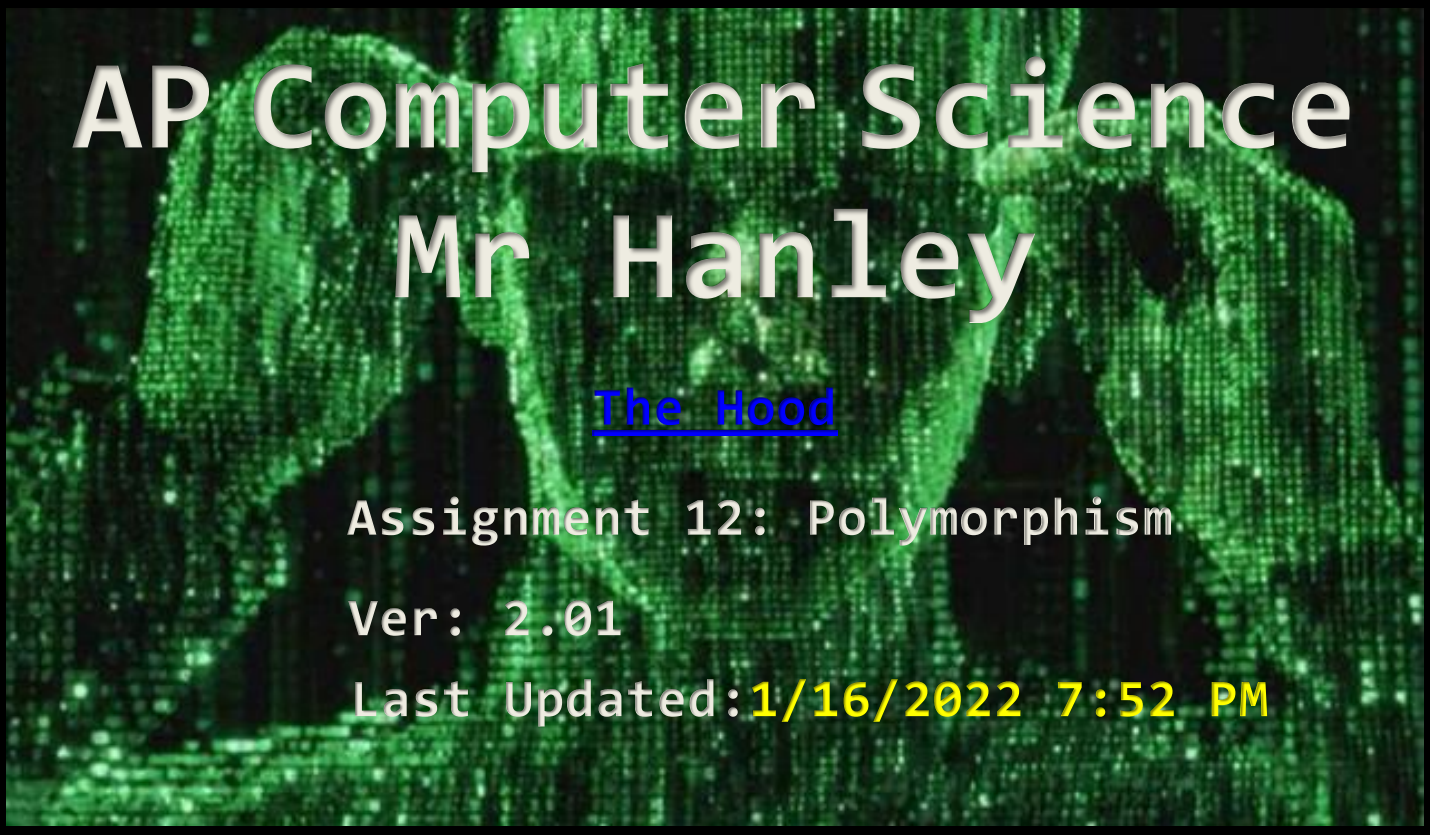
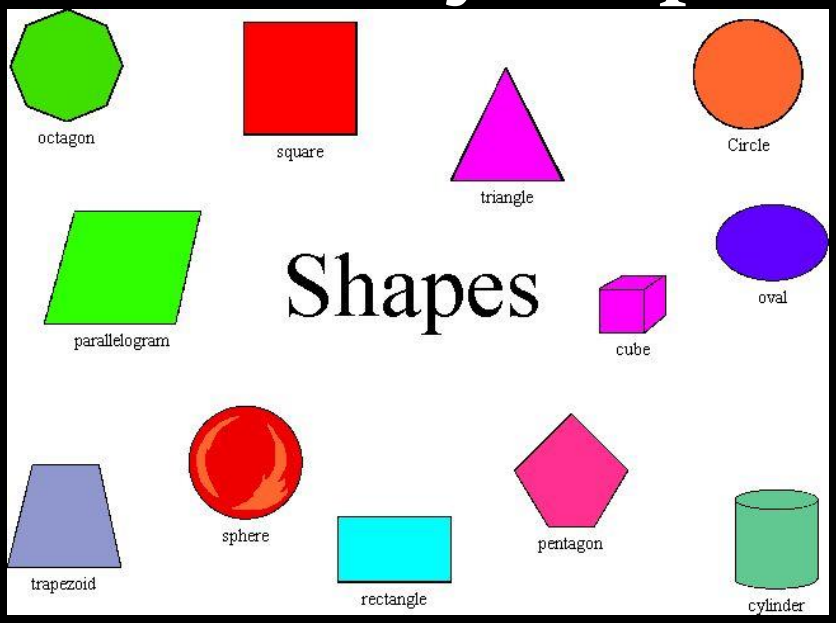


Assignment 12:Polymorphism



Binary **Ones Comp** **Twos Comp**

Polymorphism is the ability for different classes to respond to the same message uniquely. It allows for child classes to over-ride an abstract method and define each own actions.

1. **Chess Board Move Enforcement**
    a. In a chess game, a user can select a piece and then move it to a different square. For each type of piece the rules differ.
    b. Develop an abstract base class with an abstract method **isValidMove** that verifies if a move is ok for either side in the game of chess
    c. Verify with at least 3 pieces (not including king)
    d. Don't worry about whether the move involves check or not

2. **Role Playing Game Adventure**
    a. An RPG is ripe for inheritance.
    b. Develop a hierarchy with at least 6 classes
    c. Use an abstract base class with at least one abstract method like act, that subclasses can over-ride

3. **Paint Shapes**
    a. See below

We will be extending an abstract class Shape by creating some new classes. In the skeleton code project, there are two classes that extend Shape, RectangleV3 and Triangle.

These classes over-ride the abstract method draw.

draw accepts a Graphics object as a parameter. You can use this parameter **g** as a "paintbrush" to draw to the screen.

1. Develop a pentagon class that draws a pentagon to the screen.
    a. HINT: base your class off of the triangle class

2. Develop a SmileyFace class that extends Shape
    a. You need a separate outline color and fill color
    b. You need at least two eyes and a mouth
    c. HINT: You can use fill arc for a mouth

3. Develop your own unique shape class

4. **Quiz Project**
    a. Quizzes can have so many different types of questions
        i. Multiple Choice
        ii. Matching
        iii. True/False
        iv. Fill in the Blank
        v. Put in order(like the waterfall model steps)
    b. Develop an abstract Question class
    c. Have abstract methods setUpQuestion and evaluateAnswer
    d. Each subclass can do this differently
    e. Probably need a GUI

5. **Monopoly Simplified**
    a. Provide an abstract base class LandingSpot
    b. Provide an abstract method processLandingSpot
    c. Extend with Property, Chance, Go, Jail, GoToJail
    d. Must have 10 spaces you can land on
    e. Can be two human players

Project Name	Assignment 12 Polymorphic Shapes
Class 1 Name	See Skeleton. Lots of Juicy Stuff ☺
Class 2 Name	PerfectNumAnalyzer
Class 3 Name	Craps
Class 4 Name	BounceCalculator

RUBRIC

Pentagon	**30**
Smiley Face	**40**
Unique	**30**
Comments	**10**
TOTAL	**110**

Project Name	Assignment 12 Chess Board Movement
Class 1 Name	ChessBoard
Class 2 Name	ChessMain
Class 3 Name	Bishop
Class 4 Name	Pawn
Class 5 Name	Rook
Class 6 Name	Queen
Class 7 Name	King
Class 8 Name	Knight
Class 9 Name	Possible ChessFrame if you want a GUI

RUBRIC	
Basic Setup	25
Movement Rules for Piece 1	25
Movement Rules for Piece 2	25
Movement Rules for Piece 3	25
Comments	10
TOTAL	110

Project Name	Assignment 12 Role Playing Game(One Example)
Class 1 Name	RunGame
Class 2 Name	Character (Base Class)
Class 3 Name	BattleMage
Class 4 Name	Healer
Class 5 Name	Knight
Class 6 Name	Monk
Class 7 Name	Monster
Class 8 Name	Ranger
Class 9 Name	Rogue

RUBRIC	
Base Class	20
Child Class 1 implements abstract method	20
Child Class 2 implements abstract method	20
Child Class 3 implements abstract method	20
Overall Coolness	20
Comments	10
TOTAL	110

Project Name	Assignment 12 Polymorphic Quiz
Class 1 Name	Question
Class 2 Name	MultipleChoiceQuestion
Class 3 Name	PutInOrderQuestion
Class 4 Name	ShortAnswerQuestion
Class 5 Name	QuizMain

RUBRIC

Base Class	**20**
Child Class 1 implements abstract method	**20**
Child Class 2 implements abstract method	**20**
Child Class 3 implements abstract method	**20**
QuizMain which drives the process	**20**
Comments	**10**
TOTAL	**110**

Project Name	Assignment 12 Polymorphic Monopoly
Class 1 Name	MonopolyMain
Class 2 Name	LandingSpot (Base Class)
Class 3 Name	Chance
Class 4 Name	FreeParking
Class 5 Name	Go
Class 6 Name	Jail
Class 7 Name	LuxuryTax
Class 8 Name	Player(doesn't extend LandingSpot)
Class 9 Name	Property

RUBRIC

Base Class LandingSpot	20
Child Class 1 implements abstract method	20
Child Class 2 implements abstract method	20
Child Class 3 implements abstract method	20
MonopolyMain which drives the process	20
Comments	10
TOTAL	110