

SI@UCF Computer Science Camp
Object Oriented Python and pyGame
Quiz #1
Date: 6/9/2026

Name: _____

1) (10 pts) Complete the Python program below so that it reads in the number of servings for a recipe and the number of cups of chicken broth needed per serving for the recipe. Compute the minimum number of gallons of chicken broth (integer answer only) needed to fulfill your recipe needs and print this out. Note: There are 16 cups in a gallon.

```
servings = int(input("How many servings?\n"))
cupsPerServing = int(input("# of cups per serving?\n"))
```

```
print("You need to buy", numG, "gallons of chicken broth.")
```

2) (15 pts) You start with w worms in your worm collection. Each day, half of your worms (use integer division) given birth to new worms. In addition, each day, 5 worms die. For example, if you started with 20 worms, on day 1, you would have $20 + 10$ (born) $- 5$ (die) = 25 worms. On day 2 you would have $25 + 12$ (born) $- 5$ (die) = 32 worms. Complete the program below, so that it prints out the number of worms that will be alive for the first d days. (So your print should be in a loop.) You may assume that you start with 12 or more worms.

```
numW = int(input("How many worms on day 0?\n"))
d = int(input("How many days to print worm numbers?\n"))
```

3) (30 pts) Consider writing a Point class in Python, to manage a point on the Cartesian plane. Below is an incomplete version of the class. For this question you'll fill in several methods for the class. Both the x and y coordinates of the Point will be floating point numbers.

```
# Arup Guha
# 6/9/2026
# Start of a Point Class

import math

class Point:

    # Basic constructor.
    def __init__(self, x, y):
        self.x = x
        self.y = y

    # Returns the result of adding self to point2.
    def add(self, point2):
        return Point(self.x+point2.x, self.y+point2.y)

    # String representation of a fraction.
    def __str__(self):
        return "("+str(self.x)+", "+str(self.y)+")"

# Quick test.
def test():

    # Create two fractions.
    p1 = Point(2.3, 4.4)
    p2 = Point(-1.2, 2.5)

    # Add and print out!
    p3 = p1.add(p2)
    print(str(p1)+"+"+str(p2)+"="+str(p3))

# Run it.
test()
```

3a) (10 pts) Add a method to return the midpoint between self and point2. Do not change either self or point2.

```
# Return a new point that is the midpoint of self and point2.  
def midpoint(self, point2):
```

3b) (10 pts) Add a method that returns the distance between self and point2.

```
# Returns the distance between self and point2.  
def distance(self, point2):
```

3c) (10 pts) We define the dot product of two points (x_1, y_1) and (x_2, y_2) to be $x_1x_2 + y_1y_2$. Complete the method below so that it returns the dot product of self and point2.

```
# Returns the dot product of self and point2.  
def dotproduct(self, point2):
```

4) (15 pts) The flag of Germany is three rectangles from top to bottom in the following colors: black, red, yellow. For this question, complete the pyGame program below to draw the German flag. Please make the top left corner of the black rectangle (100, 100), the top left corner of the red rectangle (100, 300) and the top left corner of the yellow rectangle (100, 500). Make the height of each rectangle 200 pixels and the width of each rectangle 800 pixels.

```
import pygame, sys
from pygame.locals import *

pygame.init()
DISPLAYSURF = pygame.display.set_mode((1000, 800))
pygame.display.set_caption("German Flag")
BLACK = pygame.Color("black")
RED = pygame.Color("red")
YELLOW = pygame.Color("yellow")
WHITE = pygame.Color("white")

while True:

    for event in pygame.event.get():
        if event.type == QUIT:
            pygame.quit()
            sys.exit()

    DISPLAYSURF.fill(WHITE)

    # PUT YOUR CODE HERE, SHOULD BE THREE LINES.

    pygame.display.update()
```

5) (10 pts) In lecture, drive method to the Vehicle class, Car class and Motorcycle class. Here is the code for the drive method from the Car class:

```
def drive(self, time, avgspeed):
    distDriven = super().drive(time, avgspeed)
    self.odom += distDriven
    self.gas -= distDriven/30
```

Describe what each line of code does and why it was added.

6) (15 pts) Below is a complete pyGame program. It displays something. On the next page, describe in words what occurs when this program is interpreted.

```
import pygame, sys
from pygame.locals import *
class token:
    def __init__(self, myx, myy, mydx, mydy, myr, mycolor, myup):
        self.x = myx
        self.y = myy
        self.dx = mydx
        self.dy = mydy
        self.r = myr
        self.color = mycolor
        self.up = myup

    def move(self):
        self.x += self.dx
        self.y += self.dy

    def updateDir(self):
        if self.up and self.dy == 10:
            self.up = not self.up
        if not self.up and self.dy == -10:
            self.up = not self.up
        if self.up:
            self.dy += 1
        else:
            self.dy -= 1

    def draw(self, surf):
        pygame.draw.circle(surf, self.color, (self.x, self.y), self.r)

pygame.init()
DISPLAYSURF = pygame.display.set_mode((1000, 800))
pygame.display.set_caption("What does it do?")
RED = pygame.Color("red")
WHITE = pygame.Color("white")
clock = pygame.time.Clock()
frame = 0
items = []
while True:
    for event in pygame.event.get():
        if event.type == QUIT:
            pygame.quit()
            sys.exit()
    DISPLAYSURF.fill(WHITE)
    if frame%85 == 0:
        items.append(token(0, 400, 2, 0, 30, RED, frame%170==0))

    for x in items:
        x.move()
        x.updateDir()
        x.draw(DISPLAYSURF)
    pygame.display.update()
    clock.tick(100)
    frame += 1
```

Answer for #6 goes here

7) (5 pts) The Federation Internationale de Football Association's famous World Cup is starting on Thursday in North America. By what acronym is the organization better known?

pygame Documentation

```
# A rectangle is specified as a 4-tuple where the x pixel value
# of the top left corner is left. The y pixel value of the top
# left corner is top. The width of the rectangle is width (in the
# x direction) and the height of the rectangle is height (in the
# y direction).
```

```
Rect(left, top, width, height)
```

```
# Draws the rectangle specified in the color specified in the
# parameters on the surface specified in the parameters.
```

```
pygame.draw.rect(surface, color, rect)
```

```
# Draws a circle with the color, center and radius specified
# in the parameters on the surface specified in the parameters.
```

```
pygame.draw.circle(surface, color, center, radius)
```

Scratch Page – Please clearly mark any work on this page you would like graded.