Walkthrough: Random Circles Program

Import Statements

```
from graphics import Canvas
import random
```

- `from graphics import Canvas`: This brings in a tool called `Canvas` from a graphics library so we can draw shapes.

- `import random`: This brings in a helper library to make random choices. It's useful when we want things like random colors or positions.

Constants

```
CANVAS_WIDTH = 300
CANVAS_HEIGHT = 300
CIRCLE_SIZE = 20
N_CIRCLES = 20
```

These are constants — values we define once and use throughout the program.

- `CANVAS_WIDTH = 300`: The width of our drawing area (300 pixels).

- `CANVAS_HEIGHT = 300`: The height of our drawing area.

- `CIRCLE_SIZE = 20`: Not actually used in this program, but it might have been used for a fixed circle size.

- `N_CIRCLES = 20`: The maximum number of circles we want to draw.

The Main Function

```python
def main():
```

- This defines the main function — it's where our program starts when it runs.

Welcome Message

```python
print('Random Circles')
```

- This line prints a title to let the user know what the program is doing.

Create a Canvas

```python
canvas = Canvas(CANVAS_WIDTH, CANVAS_HEIGHT)
```

- We create a drawing surface (canvas) using the `Canvas` object with the width and height we defined earlier.

Decide How Many Circles to Draw

```python
num_of_random_circles = random.randint(5, N_CIRCLES)
```

- This line randomly picks how many circles to draw, between **5** and **20**.

- `random.randint(a, b)` returns a random number between `a` and `b`, *including both ends*.

Loop to Draw Circles

```
for i in range(num_of_random_circles):
    draw_random_circle(canvas)
```

- A `for` loop runs once for each circle we want to draw.

- On each loop, we call the function `draw_random_circle(canvas)` to draw one random circle on the canvas.

Random Color Function

```
def random_color():
```

- This function is used to pick a random color for each circle.

```
colors = ['blue', 'purple', 'salmon', 'lightblue', 'cyan',
'forestgreen']
    return random.choice(colors)
```

- `colors` is a list of color names we can use.

- `random.choice(colors)` picks one color randomly from the list.

Note: You don't need to change this function unless you want to add more color options!

Function to Draw a Random Circle

```
def draw_random_circle(canvas):
```

- This function draws **one** random circle on the canvas. It will be called multiple times inside the loop in `main()`.

Pick a Random Color

```
color = random_color()
```

- This line gets a random color using the `random_color()` function we just looked at.

Pick a Random Size

```
circle_size_random = random.randint(10, 50)
```

- This picks a random size for the circle, between **10 and 50 pixels** wide/tall.

Choose a Random Position

```
x1 = random.randint(0, CANVAS_WIDTH - circle_size_random)
y1 = random.randint(0, CANVAS_HEIGHT - circle_size_random)
```

- x1 and y1 are the top-left corner coordinates of the circle.
- We subtract the circle size to make sure the circle doesn't go off the edge of the canvas.

Calculate Bottom-Right Corner

```
x2 = x1 + circle_size_random
y2 = y1 + circle_size_random
```

- These values (x2, y2) define the bottom-right corner of the circle.

- Together, (x1, y1) and (x2, y2) define a square where the circle will be drawn inside.

Draw the Circle

```
canvas.create_oval(x1, y1, x2, y2, color)
```

- This line draws the actual circle!

- create_oval() takes:

  - The top-left corner (x1, y1)

  - The bottom-right corner (x2, y2)

  - The color to fill the circle

Entry Point

```python
if __name__ == '__main__':
    main()
```

- This makes sure the program starts by calling `main()` when you run the file.

Summary

What this program does:

- Creates a canvas.

- Randomly decides how many circles to draw (between 5 and 20).

- For each circle:

  - Picks a random size.

  - Picks a random position.

  - Picks a random color.

  - Draws the circle on the canvas.