Overview

In this lesson, you will learn how to draw **arcs directly on the Tk canvas** using the turtle library. Arcs are curved shapes that are drawn inside a bounding box and can be used to create curves, partial circles, and pie-like shapes.

Important Information

Arcs are created on the canvas in a similar way to ovals, but instead of drawing the entire oval, you draw **only part of it**.

Canvas Coordinates Reminder

When using the turtle canvas:

- `(0, 0)` is the **center of the canvas**
- Positive **x** moves right
- Negative **x** moves left
- Positive **y** moves down
- Negative **y** moves up

Creating an Arc

Arcs are created using:

```
canvas.create_arc(x1, y1, x2, y2)
```

- `(x1, y1)` and `(x2, y2)` define a **bounding rectangle**
- The arc is drawn along the edge of an invisible oval that fits inside that rectangle

By default, the arc will not be visible unless additional settings are applied.

Start Angle

The `start` setting controls **where the arc begins**, measured in degrees.

```
canvas.create_arc(x1, y1, x2, y2, start=0)
```

Angle rules:

- Angles are measured in **degrees**
- `0` degrees starts on the **right side** of the oval
- Angles increase **counterclockwise**

Examples:

- `start=0` → right
- `start=90` → up
- `start=180` → left
- `start=270` → down

Extent (Arc Length)

The `extent` setting controls **how far the arc goes** from the start angle.

```
canvas.create_arc(x1, y1, x2, y2, start=0, extent=90)
```

- `extent` is measured in degrees
- `90` draws a quarter circle
- `180` draws a half circle
- `360` draws a full circle

Arc Style

The `style` setting controls **how the arc is drawn**.

ARC

```
style="arc"
```

- Draws only the curved outline
- No lines to the center
- No fill

PIESLICE

```
style="pieslice"
```

- Draws a curved edge plus two lines to the center
- Can be filled
- Looks like a slice of pie

CHORD

```
style="chord"
```

- Draws a curved edge and a straight line connecting the ends
- Can be filled
- Does not connect to the center

Outline Color

You can change the arc's outline color using:

```
outline="blue"
```

Fill Color

Fill works only with `pieslice` and `chord` styles:

```
fill="yellow"
```

Border Thickness

You can control how thick the arc outline is using:

```
width=4
```

Dashed Arcs

You can create dashed arc outlines using:

```
dash=(8, 4)
```

This affects only the outline.

Combining Arc Settings

All arc settings can be combined in a single call:

```
canvas.create_arc(
    -100, -100, 100, 100,
    start=0,
    extent=120,
    style="pieslice",
    outline="blue",
    fill="lightblue",
    width=3
)
```

Set Up

Create a new Python file called `canvas_arcs.py`.

Copy, Change, Challenge

Copy

Copy and run the following code.

```
import turtle

screen = turtle.Screen()
canvas = screen.getcanvas()

canvas.create_arc(
    -100, -100, 100, 100,
    start=0,
    extent=180,
    style="arc",
    outline="black",
    width=3
)

turtle.done()
```

You should see a curved arc drawn on the canvas.

Change

Modify the arc so that:

- The arc starts at a different angle
- The arc covers a different extent
- The outline color is changed
- The arc is dashed

Run the program again and observe the differences.

Challenge

Add multiple arcs so that:

- One arc uses `pieslice` style with a fill color
- One arc uses `chord` style
- One arc forms a half circle
- One arc forms a quarter circle