

**S1 Appendix.** Example codes using the gCodeAPI. A cylinder surface is defined in C# (A) or python (B) language.

**A**

## C# code example

```
using GCodeAPI;

namespace PetriTaskFileTutorial
{
    class Program
    {
        static void Main(string[] args)
        {
            var task = new PetriTask("R1-D6 ", "Single ring (Diameter: 6 mm; Height: 1.8 mm)");

            double radius = 3.0d; // radius of circle
            double stepZ = 0.2d; // distance between two layers
            int maxZ = 9; // number of layers
            double zOff = 0d; // current Z offset.
            GCodeCollector code = task.Code;
            GCodeSpecial.ExtrudeRatio = 0.0405d;
            code.addCode(new GCodeLine(x: -radius, y: 0, speed: 9000d, mode: GCodeLine.SpeedModes.Fast));
            code.addCode(new GCodeLine(z: 0d, speed: 9000d, mode: GCodeLine.SpeedModes.Fast));

            for (int z = 0; z < maxZ; z++)
            {
                code.addCode(GCodeCircle.getCircleByRadius(
                    speed: 500,
                    axisAngle: 0,
                    radius: radius,
                    extrude: GCodeSpecial.ExtrudeCircle(radius));
                zOff += stepZ;
                code.addCode(new GCodeLine(z: zOff, speed: 9000d, mode: GCodeLine.SpeedModes.Slow));
            }

            task.Save(@"C:\Users\Documents\PetriPrinter\R1D6.ptf");
        }
    }
}
```

## B

### python code example

```
import sys
import clr
clr.AddReferenceToFileAndPath ('gCodeAPI.dll')
from GCodeAPI import *

def Name():
    return "R1-D6"

def Description():
    return "Single ring (Diameter: 6 mm; Height: 1.8 mm)"

def Code():
    radius = 3.0 # radius of circle
    stepZ = 0.2 # distance between two layers
    maxZ = 9 # number of layers
    zOff = 0 # current Z offset.
    code = GCodeCollector()
    GCodeSpecial.ExtrudeRatio = 0.0405
    code.addCode(GCodeLine(x = -radius, y = 0, speed = 1200, mode = GCodeLine.SpeedModes.Fast));
    code.addCode(GCodeLine(z = 0, speed = 1200, mode = GCodeLine.SpeedModes.Fast));

    for x in range(0,maxZ):
        code.addCode(GCodeCircle.getCircleByRadius(speed = 500, axisAngle = 0, radius = radius,
        extrude = GCodeSpecial.ExtrudeCircle(radius)))
        zOff += stepZ
        code.addCode(GCodeLine(z = zOff, speed = 1200, mode = GCodeLine.SpeedModes.Slow))
    return code;
```