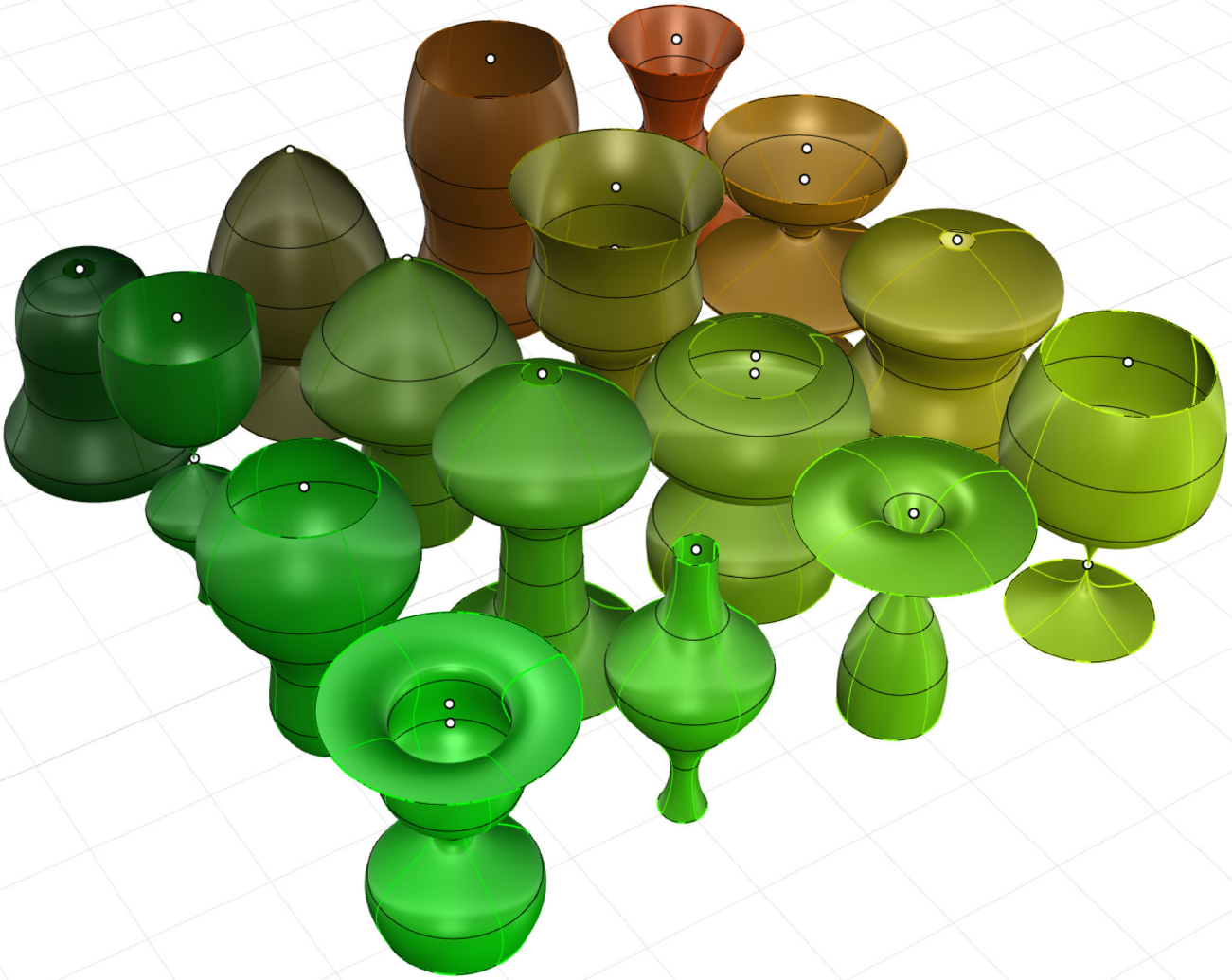

```
0   ########################################
1   ########################################
2   #NOTES: WEEK 4 ASSIGNMENT 1
3   #NAME: Maho Kobayashi
4
5   ########################################
6   ########################################
7
8   import rhinoscriptsyntax as rs
9   import random as rnd
10  import Rhino.Geometry as rg
11  import scriptcontext as sc
12
13  ########################################
14
15  #3D POINT MATRIX
16  #import modules
17  import rhinoscriptsyntax as rs
18
19  def PointMatrix(IMAX,JMAX,KMAX):
20
21          #set up empty list
22          ptList_0 = []
23          ptList_1 = []
24          ptList_2 = []
25          ptList_3 = []
26          ptList_4 = []
27          ptList_5 = []
28
29          ptDict_0 = {}
30          ptDict_1 = {}
31          ptDict_2 = {}
32          ptDict_3 = {}
33          ptDict_4 = {}
34          ptDict_5 = {}
35
36          circDict_0 = []
37          circDict_1 = []
38          circDict_2 = []
39          circDict_3 = []
40          circDict_4 = []
41          circDict_5 = []
42
43          #loop to generate point values as a product of the loop
    counter
44          #save values in list
45          for i in range(IMAX):
46                  for j in range(JMAX):
47                          for k in range(KMAX):
48                                  #define x,y,z in terms of i,j,k
49                                  x = i /.5+40
50                                  y = j /.5+45
51                                  z = k
52
53                                  #SAVING POINTS TO DICTIONARY_0
54                                  point_0 = (x,y,z)
55                                  ptDict_0[(i,j,k)] = point_0
56
```

```
56                                  #dict  =  key  value  pair
57
58                                  #DICTIONARY_1
59                                  point_1  =  (x,y,0.5)
60                                  ptDict_1[(i,j,k)]  =  point_1
61
62                                  #DICTIONARY_2
63                                  point_2  =  (x,y,1)
64                                  ptDict_2[(i,j,k)]  =  point_2
65
66                                  #DICTIONARY_3
67                                  point_3  =  (x,y,1.5)
68                                  ptDict_3[(i,j,k)]  =  point_3
69
70                                  #DICTIONARY_4
71                                  point_4  =  (x,y,2)
72                                  ptDict_4[(i,j,k)]  =  point_4
73
74                                  #DICTIONARY_5
75                                  point_5  =  (x,y,2+rnd.random())
76                                  ptDict_5[(i,j,k)]  =  point_5
77
78                                  #print  out  dictionary  key:value  pairs
79                                  #print  (i,j,k),  ':',  point_0
80
81                                  #render  point  in  rhinospace
82                                  rs.AddPoint(point_0)
83                                  rs.AddPoint(point_1)
84                                  rs.AddPoint(point_2)
85                                  rs.AddPoint(point_3)
86                                  rs.AddPoint(point_4)
87                                  rs.AddPoint(point_5)
88
89                                  #save  points  in  a  list
90                                  ptList_0.append(point_0)
91                                  ptList_1.append(point_1)
92                                  ptList_2.append(point_2)
93                                  ptList_3.append(point_3)
94                                  ptList_4.append(point_4)
95                                  ptList_5.append(point_5)
96
97  ########################################
98  ########################################
99
100 #REFERENCES
101
102 #https://developer.rhino3d.com/api/rhinoscript/math_methods/rnd.htm
103 #https://discourse.mcneel.com/t/how-to-loft-circle-through-rhinocommon/53850/2
104
105         #loop  through  dictionary  to  label  points  with  (i,j,k)  keys

106         #for  i  in  range(IMAX):
107                 #for  j  in  range(JMAX):
108                         #for  k  in  range(KMAX):
109                                 #rs.AddTextDot((i,j,k), ptDict[(i,j,k)])

110
111
```

```
111 ########################################
112
113         #Loop through dictionaries to create cirlces with randomized
      circumfrence
114         for i in range(IMAX):
115                 for j in range(JMAX):
116                         for k in range(KMAX):
117                                 circDict_0 = rs.AddCircle(ptDict_0[(i,j,k
      )],rnd.random())
118                                 circDict_1 = rs.AddCircle(ptDict_1[(i,j,k
      )],rnd.random())
119                                 circDict_2 = rs.AddCircle(ptDict_2[(i,j,k
      )],rnd.random())
120                                 circDict_3 = rs.AddCircle(ptDict_3[(i,j,k
      )],rnd.random())
121                                 circDict_4 = rs.AddCircle(ptDict_4[(i,j,k
      )],rnd.random())
122                                 circDict_5 = rs.AddCircle(ptDict_5[(i,j,k
      )],rnd.random())
123
124                                 #Loop through dictionaries to loft the
      circles
125                                 circle_1 = rs.coercecurve(circDict_0)
126                                 circle_2 = rs.coercecurve(circDict_1)
127                                 circle_3 = rs.coercecurve(circDict_2)
128                                 circle_4 = rs.coercecurve(circDict_3)
129                                 circle_5 = rs.coercecurve(circDict_4)
130                                 circle_6 = rs.coercecurve(circDict_5)
131                                 no_pt=rg.Point3d.Unset
132                                 norm_loft=rg.LoftType.Normal
133
134                                 breps = rg.Brep.CreateFromLoft([circle_1,
      circle_2,circle_3,circle_4,circle_5,circle_6],no_pt,no_pt,norm_loft,False
      ) #False
135                                 new_IDs=[sc.doc.Objects.AddBrep(brep) for
      brep in breps]
136                                 sc.doc.Views.Redraw()
137
138                                 #Loop through to color
139                                 rs.ObjectColor(new_IDs, (255/IMAX*i, 255-
      (255/JMAX)*j,255/KMAX*k))
140
141 ########################################
142
143 def main():
144
145         #get values from user
146         imax = rs.GetInteger('maximum number x', 4)
147         jmax = rs.GetInteger('maximum number y', 4)
148         kmax = rs.GetInteger('maximum number z', 1)
149
150         #call function
151         PointMatrix(imax,jmax,kmax)
152
153 #call main() function to start program
154 main()
155
156
```