

```
1 using System;
2 using TMPro;
3 using UnityEngine;
4 using UnityEngine.UI;
5
6 /// <summary>
7 /// Coordinates keeps track of the world position as well as the grid snapping mode.
8 /// </summary>
9 public class Coordinates : MonoBehaviour
10 {
11     // Singleton state reference
12     private static Coordinates instance;
13
14     /// <summary>
15     /// Dictates how the current world position within the editor scene should be interpreted.<br/>
16     /// This modified position is utilized for several actions within the scene, such as placing wires and moving circuits.<br/><br/>
17     /// <seealso cref="GRID"/>: snap current mouse position to the visual grid.<br/>
18     /// <seealso cref="NONE"/>: keep the current mouse position as is.
19     /// </summary>
20     public enum SnappingMode { GRID, NONE }
21
22     /// <summary>
23     /// The transparency value of <seealso cref="gridStatus"/> when <seealso cref="SnappingMode.NONE"/> is enabled.
24     /// </summary>
25     [SerializeField] float gridTransparencyConstant;
26
27     /// <summary>
28     /// In-scene icon that visualizes the status of <seealso cref="snappingMode"/>.
29     /// </summary>
30     [SerializeField] Image gridStatus;
31
32     /// <summary>
33     /// Toggles the <seealso cref="SnappingMode"/> currently not in use.
34     /// </summary>
35     [SerializeField] KeyCode snapToggleKey;
36
37     /// <summary>
38     /// Displays the current world coordinates to the user.
39     /// </summary>
40     [SerializeField] TextMeshProUGUI coordinateText;
41
42     /// <summary>
43     /// Stores the inspector-assigned color of <seealso cref="gridStatus"/>
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>.
44     /// </summary>
45     private Color gridStatusColor;
46
47     /// <summary>
48     /// Utilized to perform a raycast to calculate <seealso cref="mousePos"/>.
49     /// </summary>
50     private Plane raycastPlane;
51
52     /// <summary>
53     /// The current <seealso cref="SnappingMode"/>.
54     /// </summary>
55     private SnappingMode snappingMode;
56
57     /// <summary>
58     /// Stores the calculated mouse to world position.
59     /// </summary>
60     private Vector3 mousePos;
61
62     private void Update()
63     {
64         // If the snap toggle key is pressed at a valid time, switch
65         // states.
66         if (Input.GetKeyDown(snapToggleKey) &&
67             BehaviorManager.Instance.CurrentStateType !=
68             BehaviorManager.StateType.PAUSED)
69         {
70             snappingMode = snappingMode == SnappingMode.GRID ?
71                 SnappingMode.NONE : SnappingMode.GRID;
72             CurrentSnappingMode = snappingMode; // Ensures the UI is also
73             // updated.
74         }
75     }
76
77     private void Awake()
78     {
79         // Enforces a singleton state pattern
80         if (instance != null)
81         {
82             Destroy(this);
83             throw new Exception("Coordinates instance already established;
84                 terminating.");
85         }
86
87         instance = this;
88
89         // Initializes private values
90         raycastPlane = new Plane(Vector3.down,
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        GridMaintenance.Instance.GridHeight);
85     gridStatusColor = gridStatus.color;
86 }
87
88 /// <summary>
89 /// Snaps the specified position to the grid.
90 /// </summary>
91 /// <param name="normalPos">The position that should be snapped to the
    grid.</param>
92 /// <returns>The grid position.</returns>
93 public static Vector3 NormalToGridPos(Vector3 normalPos) { return new
    Vector3((int)(normalPos.x + 0.5f * Mathf.Sign(normalPos.x)),
    GridMaintenance.Instance.GridHeight, (int)(normalPos.z + 0.5f *
    Mathf.Sign(normalPos.z))); }
94
95 // Getter methods
96 public static Coordinates Instance { get { return instance; } }
97
98 /// <summary>
99 /// Returns a new ray from the camera to the current mouse position.
100 /// </summary>
101 private Ray CameraRay { get { return
    CameraMovement.Instance.PlayerCamera.ScreenPointToRay
    (Input.mousePosition); } }
102
103 /// <summary>
104 /// Calculates and returns the current grid position.
105 /// </summary>
106 public Vector3 GridPos { get { return NormalToGridPos(mousePos); } }
107
108 /// <summary>
109 /// Calculates and returns the current mouse position.
110 /// </summary>
111 public Vector3 MousePos
112 {
113     get
114     {
115         Ray ray = CameraRay;
116
117         if (raycastPlane.Raycast(ray, out float distance))
118         {
119             mousePos = ray.GetPoint(distance);
120
121             // Updates the coordinates UI if the game is not currently
            paused
122             if (BehaviorManager.Instance.CurrentStateType !=
                BehaviorManager.StateType.PAUSED) coordinateText.text =
                "(" + mousePos.x.ToString("0.0") + ", " +
                mousePos.z.ToString("0.0") + ")";

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123
124         return new Vector3(mousePos.x,
125                               GridMaintenance.Instance.GridHeight, mousePos.z);
126     }
127     throw new Exception("Unable to obtain new mouse position --
128                           raycast failed.");
129 }
130
131 /// <summary>
132 /// Returns a modified version of <seealso cref="mousePos"/> based on
133 /// <seealso cref="snappingMode"/>.
134 /// </summary>
135 public Vector3 ModePos { get { return snappingMode ==
136                           SnappingMode.GRID ? GridPos : MousePos; } }
137
138 /// <summary>
139 /// Serves as a getter method as well as a setter method for both
140 /// <seealso cref="snappingMode"/> and <seealso cref="gridStatus"/>.
141 /// </summary>
142 public SnappingMode CurrentSnappingMode { get { return snappingMode; }
143     set
144     {
145         snappingMode = value;
146
147         if (value == SnappingMode.GRID)
148         {
149             gridStatus.color = gridStatusColor;
150         }
151         else
152         {
153             Color temp = gridStatusColor;
154
155             temp.a = gridTransparencyConstant;
156             gridStatus.color = temp;
157         }
158     }
159 }
```