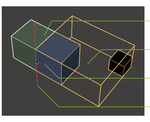
PickHelper

A Visual Guide

The PickHelper class in the SketchUp Ruby API can be confusing. The names of its methods isn't immediatly obvious. This chart will attempt to break down the structure of the class for a better understanding of the data you get.

The Test Scene



The Pick

When you perform a pick the PickHelper resolves a tree of possible entities that fit the pick.

Lets see what kind of data we get when we pick a point where two groups and a lone edge all overlap with entities.

PickHelper.all_picked

```
pickhelper.all_picked

[
  #<Sketchup::Edge:0xe5ff5ec>,
  #<Sketchup::Group:0xe67e054>,
  #<Sketchup::ComponentInstance:0xe5fe91c>,
  #<Sketchup::Group:0xe67d67c>,
  #<Sketchup::ComponentInstance:0xe5fe91c>,
  #<Sketchup::ComponentInstance:0xe5fe91c>,
  #<Sketchup::Group:0xe67e054>
]
```

The first surprice with the pickhelper is that PickHelper.all_picked returns an array that might contain duplicates.

As in our example we're getting three references each to our groups.

So what is going on here?

The PickHelper will also look forthe entities inside the groups as possible picks. A Group is after all just an abstract concept to organize entities in logical sets.

PickHelper keeps digging until it finds an entity that isn't a Group, ComponentInstance or Image - usually an Edge or Face.

So in our example we picked a point which matches seven entities:

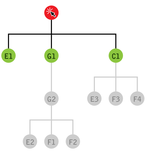
The obvious is E1 which is in the current context.

Then we have the corner edge (E2) and it's faces (F1 & F2) of G2, which is nested inside G1.

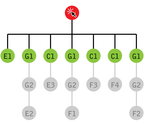
Finally we have the corner edge (E3) of C1 and it's two adjecant faces (F3 & F4).

So when we think of how the model hierarcy works we can imagine the pick result to be like the tree illustated to the right here.

But why did we not get an array with just G1, G2 and E1? Why all the duplicates?



The Model View of the Pick



The PickHelper Results Tree

The reason is that PickHelper builds a tree where each branch is a roadmap back up to the root.

PickHelper.all_picked is just a cross section of this tree - highlighted in green in the right illustration.

In other words; each item in PickHelper.all_picked is the first node in each branch.

The first node in a branch is always an entity located in the current context. (model.active_entities).

Accessing a Branch

```
pickhelper.count

7
```

```
pickhelper.path_at(1)

[
  #<Sketchup::Group:0xe67e054>,
  #<Sketchup::Group:0xe67d67c>,
  #<Sketchup::Edge:0xe5fdb84>
]
```

```
# Iterate all pick-routes:
pickhelper.count.times { |index|
  branch = pickhelper.path_at( index )
  p branch
}
```

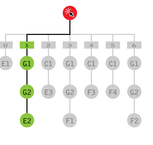
```
pickhelper.depth_at(1)

3
```

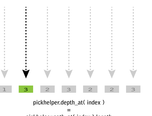
Each branch in the pick-tree can be accessed by its index.

pickhelper.count will tell you how many different pick-routes there are.

pickhelper.path_at(index) will give you an array of entities for the given branch index.

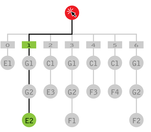
For each item on a branch you are removed one step from the current context.





Leaves

```
pickhelper.leaf_at(1)

#<Sketchup::Face:0xe5fdb64>
```



This method is one which name describes very well what it returns - once you know that the pickhelper returns a tree of branches.

It's the last item on the branch and it will be an Edge, Face, ConstructionPoint or similar - not a Group or ComponentInstance.

Note that an Image is an instance just like a Group or ComponentInstance. If you click on an Image in the current context the branch will be an array of the Image and the face inside the Image.

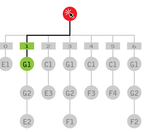
pickhelper.leaf_at(index)
=
pickhelper.path_at(index).last

```
pickhelper.element_at(1)

#<Sketchup::Group:0xe67e054>
```

PickHelper.element_at(index) will always return an entity from the current context - **the first item on the given branch.**

Opposed to pickhelper.leaf_at, this may return any entity type including groups or components.

pickhelper.element_at(index)
=
pickhelper.path_at(index).first




```
pickhelper.transformation_at(1)

#<Geom::Transformation:0xe57a1bc>
```

PickHelper.transformation_at(index) returns the combined transformation for each of the containers between the current context and the leaf.

In our example it means it's the combinations of: G1.transformation * G2.transformation

That gives us the transformation needed to converts the coordinates of E2 into the coordinates of the current context.

Best Picks

```
pickhelper.picked_edge

#<Sketchup::Edge:0xe5ff5ec>
```

```
pickhelper.picked_face

#<Sketchup::Face:0xe5fd6f4>
```

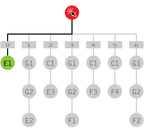
```
pickhelper.picked_element

nil
```

The order og the branches isn't completely random as one might initially think. **The path index relates to how good a pick SketchUp consider it - lower index means better pick.**

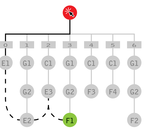
When you use pickhelper.picked_edge it will return the first edge it finds in the paths availible. The edge will always be a leaf.

Same rules applies to pickhelper.picked_face and pickhelper.picked_element.

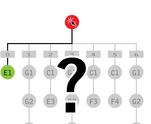
pickhelper.picked_element returns an entity that isn't an Edge, Face, Group, ComponentInstance or Image.



pickhelper.picked_edge



pickhelper.picked_face



pickhelper.best_picked

Quote from the API docs:

The best_picked method is used to retrieve the "best" entity picked (entity that you would have picked if you were using the select tool).

This method does exactly what the description says, but exactly what rules it follows is unclear. The pick is not based on the lowest index.

In our example it happened to be so because we only only had one edge in current context while the rest where groups or components.

Had we removed the edge the best pick could be either C1 or G1.

Segments and Points

```
# Test a single point.
pickhelper.test_point( point, x, y )
```

```
# Testing multiple points faster.
pickhelper.init( x, y )
for point in points
  p pickhelper.test_point( point )
end
```

PickHelper serves many purposes, which is one of the reasons why it's many methods can be confusing. It's not immediatly obvious which ones are related.

The last remaining methods of the PickHelper allows you to test a set of 3D points for picking - no entities of any kind.

These can be particulary useful when you create custom tools that draw virtual geometry in the screen for the user to interact with.

```
# Test a segment.
pickhelper.pick_segment( point, x, y )
```

```
# Testing multiple segments faster.
pickhelper.init( x, y )
for segment in segments
  p pickhelper.pick_segment( segment )
end
```