Function Documentation:`points_in_contour`

1 Description

The `points_in_contour` function identifies which points from a given list `points` lie within a specified contour `contour1`. It uses OpenCV's `cv2.pointPolygonTest` to determine if each point is inside or on the boundary of the contour and collects these points.

2 Function Definition

```python
def points_in_contour(points, contour1):
    # gather any points in the contour
    new_points = []
    for i in range(len(points)):
        # Using cv2.pointPolygonTest to check each point of contour1 against contour2
        point = points[i]
        if cv2.pointPolygonTest(contour1, point, False) >= 0:
            new_points.append(point)
    return new_points
```

3 Function Explanation

3.1 Step-by-Step Breakdown

Function 1: Initialize List

Initialize an empty list `new_points` to store points that lie within or on the boundary of the contour.

```python
new_points = []
```

Explanation: The function starts by initializing an empty list `new_points` which will be used to store the points that are either inside the contour or on its boundary.

Function 2: Check Point Position

Check if each point from the `points` list is inside or on the boundary of `contour1`.

```python
for i in range(len(points)):
    point = points[i]
```

```
    if cv2.pointPolygonTest(contour1, point, False) >= 0:
        new_points.append(point)
```

Explanation: The function iterates through each point in `points` and uses `cv2.pointPolygonTest` to check if the point lies inside or on the boundary of `contour1`. If the point meets this criterion, it is added to `new_points`.

Function 3: Return Points

Return the list `new_points` containing all points that are inside or on the boundary of the contour.

```
return new_points
```

Explanation: The function returns the list `new_points` which includes all points from the original list that were found to be inside or on the boundary of `contour1`.

4 Conclusion

The `points_in_contour` function is used to filter out and collect points from a given list that are within or on the boundary of a specified contour. This can be useful for various tasks in image processing and contour analysis.