Possible Variations

We have seen how to calculate the sum of elements in a range. We can also use segment trees to compute other reductions on the array such as maximum in a range, minimum in a range, xor of a range, gcd of a range, etc.
The only change that is required is in merging of child node's data to compute the current node data.

We currently have :

currentNodeData = leftChildData + rightChildData

Now to compute any other operation for example max, we need to change it to:

currentNodeData = max(leftChildData , rightChildData)

Other operations can be computed similarly.
We also need to set an identity element, say id, which satisfies the property.

merge(data, id) = data

where the merge is the operation we want to perform (max, min, sum, etc).
The value of id for max operation can be -infinity, for sum can be 0 etc.

Application of segment trees.

- Segment Trees can be used to solve Range Min/Max & Sum Queries in O(log n) time.
- They provide an efficient way to handle updates and process queries online.
- They can be also used to perform non-commutative merge operations which can be used to solve various problems like - maximum sum subarray in a range.
- One of the real-life applications of segment trees may be in geographical information system where one may be required to find some property (say temperature) is some range of information with updates.