

# Übung 11 – Algorithmen II

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[https://algo2.iti.kit.edu/AlgorithmenII\\_WS23.php](https://algo2.iti.kit.edu/AlgorithmenII_WS23.php)

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```
    result = current_weight;
    return true;
}

for( EdgeID eid = graph.edgeBegin( current ); eid != graph.edgeEnd( current ); ++eid ){
    const Edge & edge = graph.getEdge( eid );
    COUNTING( statistic_data.inc( DijkstraStatisticData::TOUCHED_EDGES ); )
    if( edge.forward ){
        COUNTING( statistic_data.inc( DijkstraStatisticData::RELAXED_EDGES ); )
        weight new_weight = edge.weight + current_weight;
        GUARANTEE( new_weight >= current_weight, std::runtime_error, "Weight overflow detected." );
        if( !priority_queue.isReached( edge.target ) ){
            COUNTING( statistic_data.inc( DijkstraStatisticData::SUCCESSFULLY_RELAXED_EDGES ); )
            COUNTING( statistic_data.inc( DijkstraStatisticData::REACHED_NODES ); )
            priority_queue.push( edge.target, new_weight );
        } else {
            if( priority_queue.getCurrentKey( edge.target ) > new_weight ){
                COUNTING( statistic_data.inc( DijkstraStatisticData::SUCCESSFULLY_RELAXED_NODES ); )
                priority_queue.decreaseKey( edge.target, new_weight );
            }
        }
    }
}
```

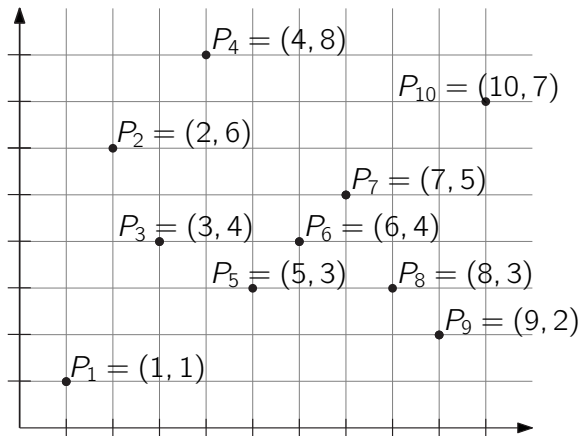
- Evaluation der Vorlesung
- Geometrische Algorithmen: Range-Queries mit Wavelet Trees
- Evaluation der Übung
- Besprechung ÜB 5

# Evaluation der Vorlesung

Evaluation (**nur Vorlesung!**)

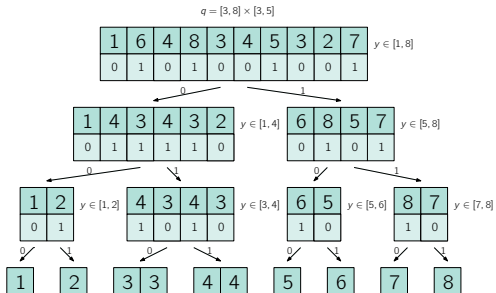
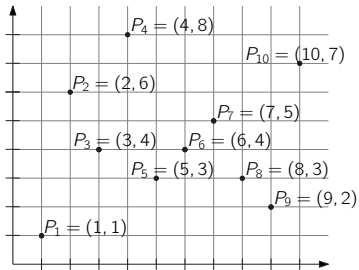
# 2D Range Queries

## Wavelet Tree



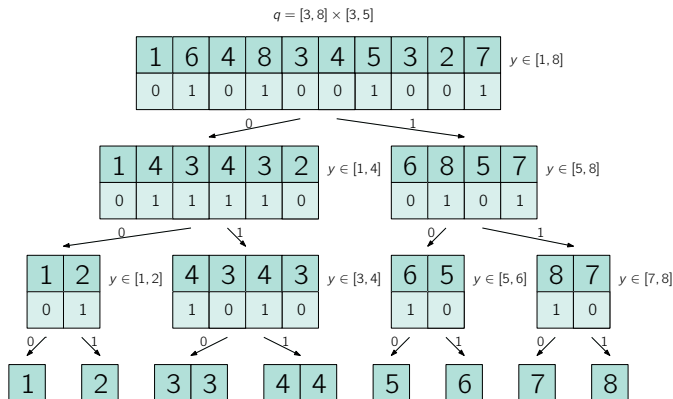
# 2D Range Queries

## Wavelet Tree



# 2D Range Queries

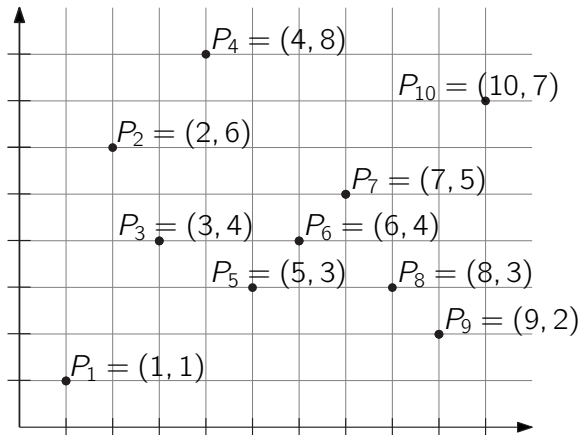
## Wavelet Tree



Auf einem  $n \times n$  Grid braucht ein Wavelet Tree  $n \log n + o(n \log n)$  Bits Speicherplatz

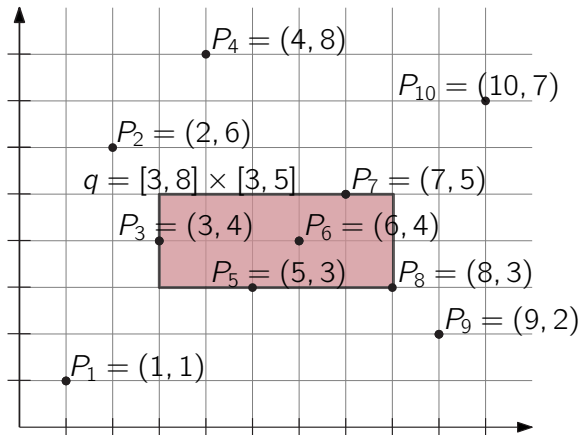
# 2D Range Queries

## Wavelet Tree - Count Operation



# 2D Range Queries

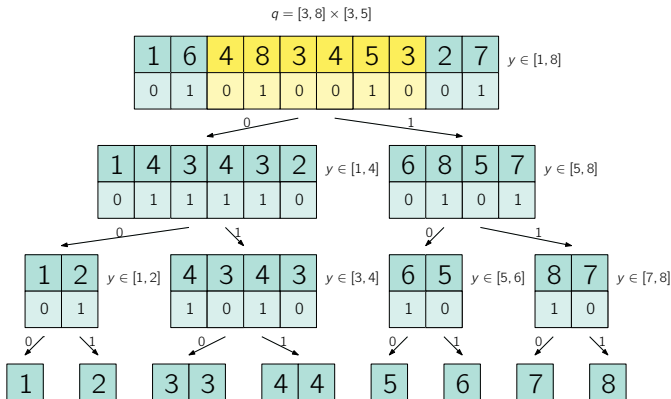
## Wavelet Tree - Count Operation





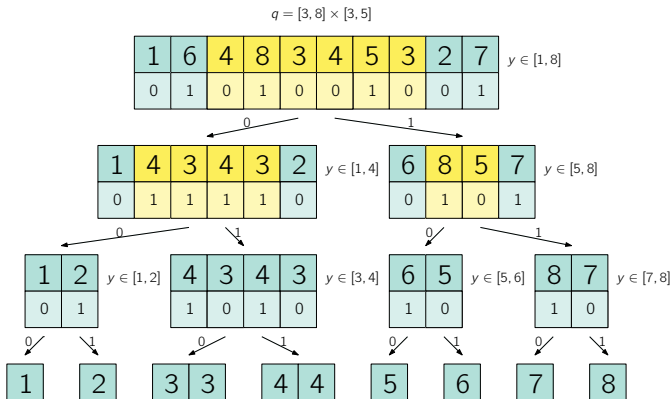
# 2D Range Queries

## Wavelet Tree - Count Operation



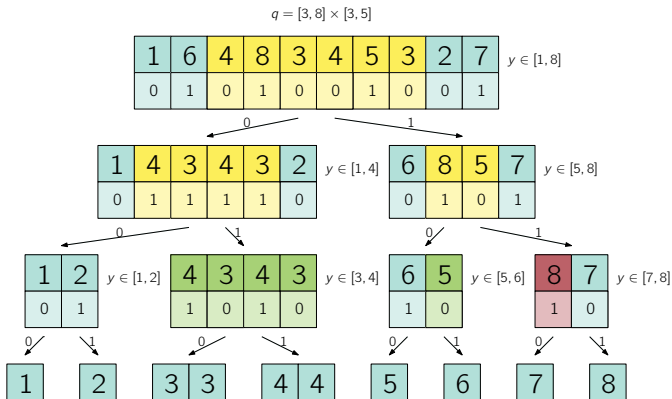
# 2D Range Queries

## Wavelet Tree - Count Operation



# 2D Range Queries

## Wavelet Tree - Count Operation



# Evaluation der Übung

Evaluation (**nur Übung!**)

## Besprechung Übungsblatt 5

# Ende!



# Feierabend!