

MMLT

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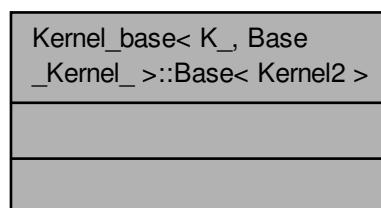
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## 1 Class Documentation

### 1.1 Kernel\_base< K\_, Base\_Kernel\_ >::Base< Kernel2 > Struct Template Reference

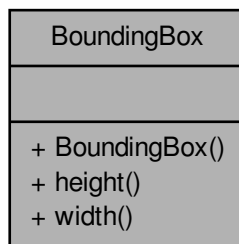
Collaboration diagram for Kernel\_base< K\_, Base\_Kernel\_ >::Base< Kernel2 >:



### 1.2 BoundingBox Class Reference

```
#include <bounding_box.h>
```

Collaboration diagram for BoundingBox:



#### Public Member Functions

- `BoundingBox (const PointSet &points)`
- `Number height () const`
- `Number width () const`

#### 1.2.1 Constructor & Destructor Documentation

1.2.1.1 `BoundingBox::BoundingBox ( const PointSet & points )` `[inline]`

#### 1.2.2 Member Function Documentation

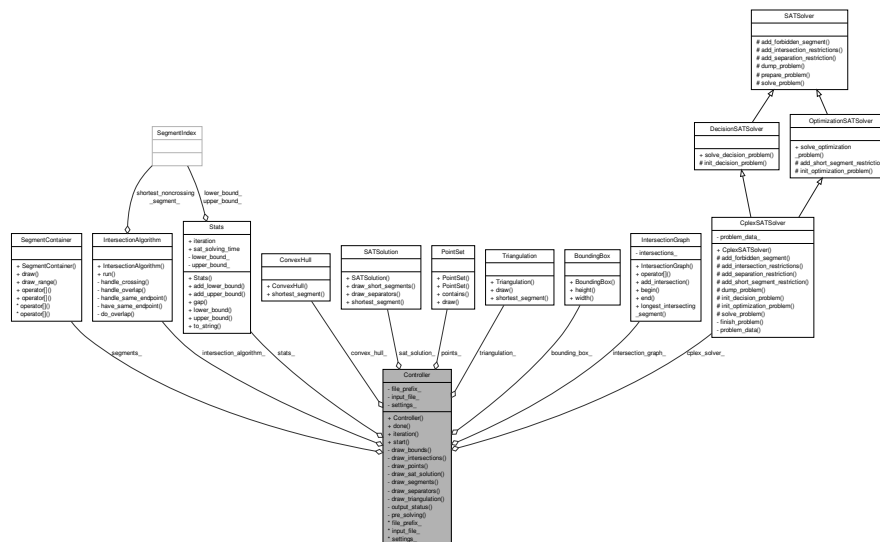
1.2.2.1 `Number BoundingBox::height ( ) const` `[inline]`

1.2.2.2 `Number BoundingBox::width ( ) const` `[inline]`

### 1.3 Controller Class Reference

```
#include <controller.h>
```

Collaboration diagram for Controller:



## Public Member Functions

- Controller (const QString &file\_prefix, QFile &input\_file, const QSettings &settings)
- void done ()
- bool iteration ()
- bool start ()

## Private Member Functions

- `void draw_bounds () const`
- `void draw_intersections () const`
- `void draw_points (SVGPainter &painter) const`
- `void draw_sat_solution () const`
- `void draw_segments (SVGPainter &painter) const`
- `void draw_separators () const`
- `void draw_triangulation () const`
- `void output_status () const`
- `void pre_solving ()`

### Private Attributes

**independent members**

- CplexSATSolver cplex\_solver\_
- IntersectionAlgorithm intersection\_algorithm\_
- SATSolution sat\_solution\_
- Stats stats

## input parameters

- const QString & file\_prefix\_
- QFile & input\_file\_
- const QSettings & settings\_

**dependent on input parameter**

- `const PointSet points_`

**dependent on input points**

- `const BoundingBox bounding_box_`
- `const ConvexHull convex_hull_`
- `SegmentContainer segments_`
- `Triangulation triangulation_`

**dependent on segments**

- `IntersectionGraph intersection_graph_`

**1.3.1 Constructor & Destructor Documentation**

**1.3.1.1** `Controller::Controller ( const QString & file_prefix, QFile & input_file, const QSettings & settings )`

**1.3.2 Member Function Documentation**

**1.3.2.1** `void Controller::done ( )`

called after the algorithm finished

**1.3.2.2** `void Controller::draw_bounds ( ) const [private]`

**1.3.2.3** `void Controller::draw_intersections ( ) const [private]`

**1.3.2.4** `void Controller::draw_points ( SVGPainter & painter ) const [private]`

**1.3.2.5** `void Controller::draw_sat_solution ( ) const [private]`

**1.3.2.6** `void Controller::draw_segments ( SVGPainter & painter ) const [private]`

**1.3.2.7** `void Controller::draw_separators ( ) const [private]`

**1.3.2.8** `void Controller::draw_triangulation ( ) const [private]`

**1.3.2.9** `bool Controller::iteration ( )`

run next iteration

**Returns**

true if next iteration should be triggered

**1.3.2.10** `void Controller::output_status ( ) const [private]`

dumps the current algorithm status

**1.3.2.11** `void Controller::pre_solving ( ) [private]`

does some pre-processing

**1.3.2.12** `bool Controller::start ( )`

start the algorithm

**Returns**

true if iteration should be triggered

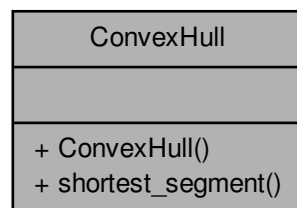
## 1.3.3 Member Data Documentation

- 1.3.3.1 `const BoundingBox Controller::bounding_box_` [private]
- 1.3.3.2 `const ConvexHull Controller::convex_hull_` [private]
- 1.3.3.3 `CplexSATSolver Controller::cplex_solver_` [private]
- 1.3.3.4 `const QString& Controller::file_prefix_` [private]
- 1.3.3.5 `QFile& Controller::input_file_` [private]
- 1.3.3.6 `IntersectionAlgorithm Controller::intersection_algorithm_` [private]
- 1.3.3.7 `IntersectionGraph Controller::intersection_graph_` [private]
- 1.3.3.8 `const PointSet Controller::points_` [private]
- 1.3.3.9 `SATSolution Controller::sat_solution_` [private]
- 1.3.3.10 `SegmentContainer Controller::segments_` [private]
- 1.3.3.11 `const QSettings& Controller::settings_` [private]
- 1.3.3.12 `Stats Controller::stats_` [private]
- 1.3.3.13 `Triangulation Controller::triangulation_` [private]

## 1.4 ConvexHull Class Reference

```
#include <convex_hull.h>
```

Collaboration diagram for ConvexHull:



## Public Member Functions

- ConvexHull (const PointSet &points)
- const SegmentIndex & shortest\_segment (const SegmentContainer &segments) const

## 1.4.1 Constructor &amp; Destructor Documentation

## 1.4.1.1 ConvexHull::ConvexHull ( const PointSet &amp; points )

compute convex hull of given point set



### 1.4.2 Member Function Documentation

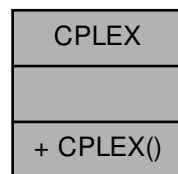
#### 1.4.2.1 `const SegmentIndex & ConvexHull::shortest_segment ( const SegmentContainer & segments ) const`

find the convex hull segment with minimum length

## 1.5 CPLEX Class Reference

```
#include <concert.h>
```

Collaboration diagram for CPLEX:



### Public Member Functions

- `CPLEX ()`

### 1.5.1 Detailed Description

ugly CPLEX code is not our fault helper class for CPLEX concert API

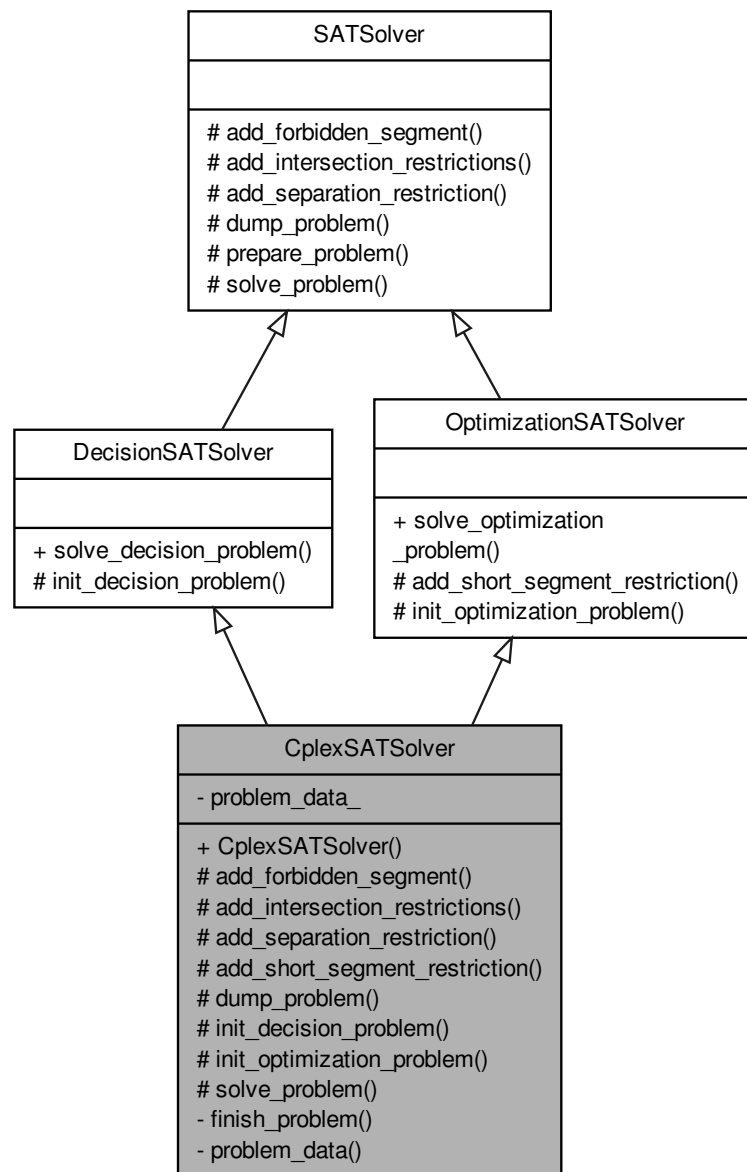
### 1.5.2 Constructor & Destructor Documentation

#### 1.5.2.1 `CPLEX::CPLEX( )` `[inline]`

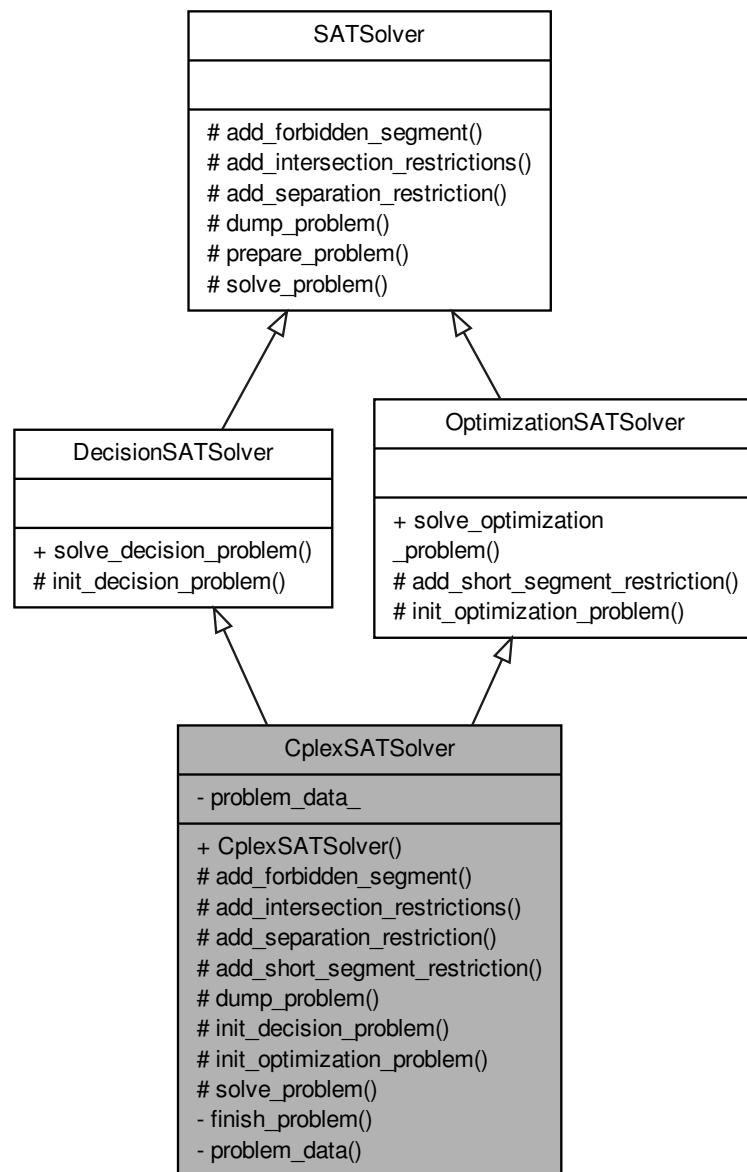
## 1.6 CplexSATSolver Class Reference

```
#include <cplex_sat_solver.h>
```

Inheritance diagram for CplexSATSolver:



Collaboration diagram for CplexSATSolver:



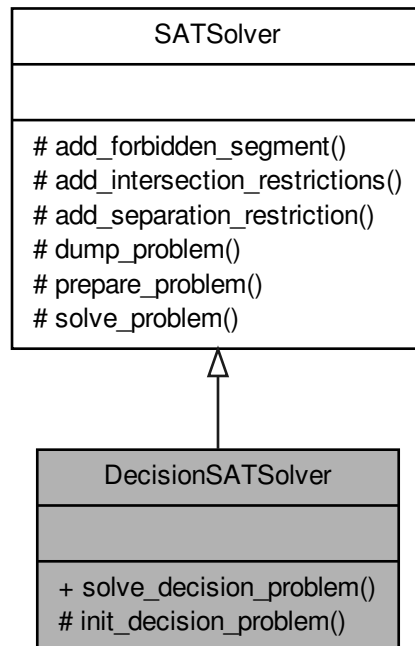
#### Classes

- struct ProblemData

#### Public Member Functions

- CplexSATSolver ()

Collaboration diagram for DecisionSATSolver:



#### Public Member Functions

- `void solve_decision_problem (const QSettings &settings, const QString &file_prefix, const SATProblem &problem, SATSolution &solution)`

#### Protected Member Functions

- `virtual void init_decision_problem (const SATProblem *problem)=0`

#### 1.6.1 Detailed Description

interface for decision SAT solvers

#### 1.6.2 Member Function Documentation

- 1.6.2.1** `virtual void DecisionSATSolver::init_decision_problem ( const SATProblem * problem )` `[protected]`, `[pure virtual]`

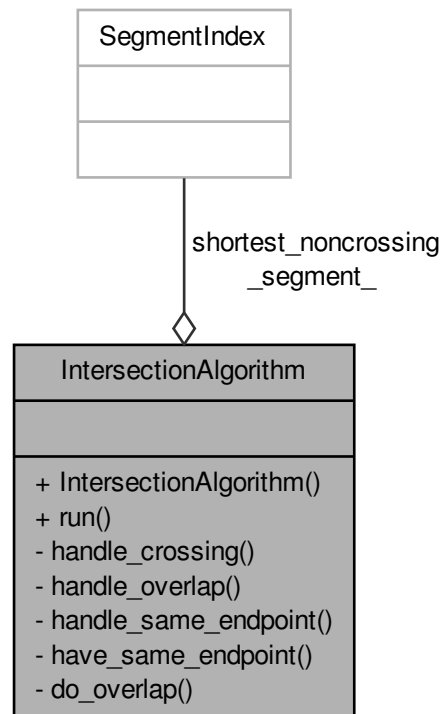
Implemented in `CplexSATSolver`.

- 1.6.2.2** `void DecisionSATSolver::solve_decision_problem ( const QSettings & settings, const QString & file_prefix, const SATProblem & problem, SATSolution & solution )`

## 1.7 IntersectionAlgorithm Class Reference

```
#include <intersection_algorithm.h>
```

Collaboration diagram for IntersectionAlgorithm:



## Public Member Functions

- IntersectionAlgorithm ()
- void run (IntersectionGraph &igraph, SegmentContainer &segments)

## Public Attributes

- SegmentIndex shortest\_noncrossing\_segment\_

## Private Member Functions

- void handle\_crossing (IntersectionGraph &igraph, const Segment &s1, const Segment &s2)
- void handle\_overlap (IntersectionGraph &igraph, const Segment &s1, const Segment &s2)
- void handle\_same\_endpoint (const Segment &s1, const Segment &s2) const
- bool have\_same\_endpoint (const Segment &s1, const Segment &s2) const
- bool do\_overlap (Segment &s1, Segment &s2) const

## 1.7.1 Constructor &amp; Destructor Documentation

## 1.7.1.1 IntersectionAlgorithm::IntersectionAlgorithm ( )

## 1.7.2 Member Function Documentation

## 1.7.2.1 bool IntersectionAlgorithm::do\_overlap ( Segment &amp; s1, Segment &amp; s2 ) const [private]

checks if two segments overlap

## Returns

the outer segment

## 1.7.2.2 void IntersectionAlgorithm::handle\_crossing ( IntersectionGraph &amp; igrph, const Segment &amp; s1, const Segment &amp; s2 ) [private]

segments cross

## 1.7.2.3 void IntersectionAlgorithm::handle\_overlap ( IntersectionGraph &amp; igrph, const Segment &amp; s1, const Segment &amp; s2 ) [private]

segments intersect but do not cross

## 1.7.2.4 void IntersectionAlgorithm::handle\_same\_endpoint ( const Segment &amp; s1, const Segment &amp; s2 ) const [private]

segments have the same end point

## 1.7.2.5 bool IntersectionAlgorithm::have\_same\_endpoint ( const Segment &amp; s1, const Segment &amp; s2 ) const [private]

checks if two segments share an endpoint

## Returns

the endpoint

## 1.7.2.6 void IntersectionAlgorithm::run ( IntersectionGraph &amp; igrph, SegmentContainer &amp; segments )

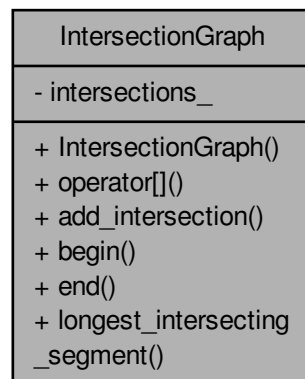
## 1.7.3 Member Data Documentation

## 1.7.3.1 SegmentIndex IntersectionAlgorithm::shortest\_noncrossing\_segment\_

## 1.8 IntersectionGraph Class Reference

```
#include <intersection_graph.h>
```

Collaboration diagram for IntersectionGraph:



#### Public Member Functions

- IntersectionGraph (const SegmentIndex &size)
- const Intersections & operator[] (const SegmentIndex &index) const
- void add\_intersection (const Segment &s1, const Segment &s2)
- IntersectionsVector::const\_iterator begin () const
- IntersectionsVector::const\_iterator end () const
- const SegmentIndex & longest\_intersecting\_segment (const SegmentIndex &index) const

#### Private Attributes

- IntersectionsVector intersections\_

#### 1.8.1 Constructor & Destructor Documentation

##### 1.8.1.1 IntersectionGraph::IntersectionGraph ( const SegmentIndex & size )

default constructor

#### 1.8.2 Member Function Documentation

##### 1.8.2.1 void IntersectionGraph::add\_intersection ( const Segment & s1, const Segment & s2 )

add two intersecting segments to the graph

##### 1.8.2.2 IntersectionsVector::const\_iterator IntersectionGraph::begin ( ) const [inline]

##### 1.8.2.3 IntersectionsVector::const\_iterator IntersectionGraph::end ( ) const [inline]

##### 1.8.2.4 const SegmentIndex & IntersectionGraph::longest\_intersecting\_segment ( const SegmentIndex & index ) const

##### 1.8.2.5 const Intersections& IntersectionGraph::operator[] ( const SegmentIndex & index ) const [inline]

## Returns

all intersecting segments for a segment

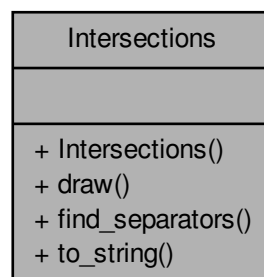
## 1.8.3 Member Data Documentation

## 1.8.3.1 IntersectionsVector IntersectionGraph::intersections\_ [private]

## 1.9 Intersections Class Reference

```
#include <intersections.h>
```

Collaboration diagram for Intersections:



## Public Member Functions

- Intersections ()
- void draw (QPainter &painter, const SegmentContainer &segments) const
- void find\_separators (const SegmentIndex &segment\_index, const SegmentContainer &segments, std::vector< SegmentIndex > &separators) const
- QString to\_string (const SegmentContainer &segments) const

## 1.9.1 Detailed Description

sorted set of intersecting segments

## 1.9.2 Constructor &amp; Destructor Documentation

## 1.9.2.1 Intersections::Intersections ( ) [inline]

default constructor

## 1.9.3 Member Function Documentation

1.9.3.1 void Intersections::draw ( QPainter & *painter*, const SegmentContainer & *segments* ) const

draws intersections using QPainter



1.9.3.2 void Intersections::find\_separators ( const SegmentIndex & *segment\_index*, const SegmentContainer & *segments*, std::vector< SegmentIndex > & *separators* ) const

finds all separators for a given segment and stores them in the passed container

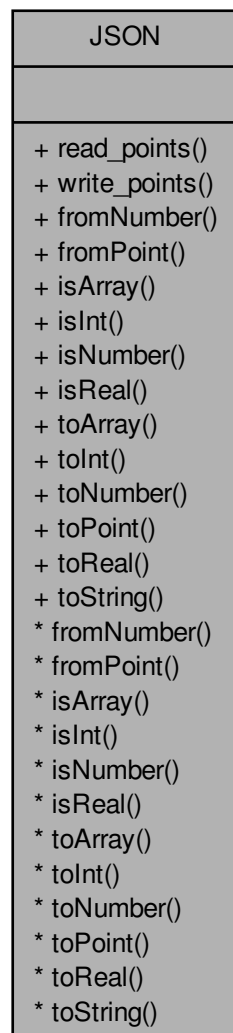
1.9.3.3 QString Intersections::to\_string ( const SegmentContainer & *segments* ) const

output intersections to QString

## 1.10 JSON Class Reference

```
#include <json.h>
```

Collaboration diagram for JSON:



### Static Public Member Functions

- `template<typename OutputIterator >`  
`static bool read_points (QFile &file, OutputIterator output)`
- `template<typename Container >`  
`static bool write_points (const std::string &file_name, Container points)`

### helper functions

- `static JSONValue fromNumber (const Number &value)`
- `static JSONArray fromPoint (const Point &point)`
- `static bool isArray (const JSONValue &value)`
- `static bool isInt (const JSONValue &value)`
- `static bool isNumber (const JSONValue &value)`
- `static bool isReal (const JSONValue &value)`
- `static const JSONArray & toArray (const JSONValue &value)`
- `static int toInt (const JSONValue &value)`
- `static Number toNumber (const JSONValue &value)`
- `static Point toPoint (const JSONValue &value)`
- `static double toReal (const JSONValue &value)`
- `static const std::string & toString (const JSONValue &value)`

#### 1.10.1 Member Function Documentation

1.10.1.1 `JSON::JSONValue JSON::fromNumber ( const Number & value ) [static]`

1.10.1.2 `JSON::JSONArray JSON::fromPoint ( const Point & point ) [static]`

1.10.1.3 `bool JSON::isArray ( const JSONValue & value ) [static]`

1.10.1.4 `bool JSON::isInt ( const JSONValue & value ) [static]`

1.10.1.5 `bool JSON::isNumber ( const JSONValue & value ) [static]`

1.10.1.6 `bool JSON::isReal ( const JSONValue & value ) [static]`

1.10.1.7 `template<typename OutputIterator > static bool JSON::read_points ( QFile & file, OutputIterator output )`  
`[inline], [static]`

1.10.1.8 `const JSON::JSONArray & JSON::toArray ( const JSONValue & value ) [static]`

1.10.1.9 `int JSON::toInt ( const JSONValue & value ) [static]`

1.10.1.10 `Number JSON::toNumber ( const JSONValue & value ) [static]`

1.10.1.11 `Point JSON::toPoint ( const JSONValue & value ) [static]`

1.10.1.12 `double JSON::toReal ( const JSONValue & value ) [static]`

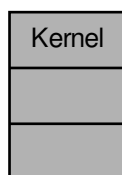
1.10.1.13 `const std::string & JSON::toString ( const JSONValue & value ) [static]`

1.10.1.14 `template<typename Container > static bool JSON::write_points ( const std::string & file_name, Container points )`  
`[inline], [static]`

## 1.11 Kernel Struct Reference

```
#include <kernel.h>
```

Collaboration diagram for Kernel:



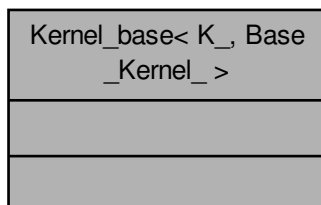
### 1.11.1 Detailed Description

customized kernel

## 1.12 Kernel\_base< K\_, Base\_Kernel\_ > Class Template Reference

```
#include <kernel.h>
```

Collaboration diagram for Kernel\_base< K\_, Base\_Kernel\_ >:



### Classes

- struct Base

### 1.12.1 Detailed Description

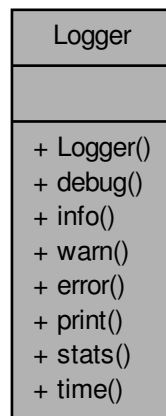
```
template<typename K_, typename Base_Kernel_>class Kernel_base< K_, Base_Kernel_ >
```

kernel base with customized PointC2 and SegmentC2

## 1.13 Logger Class Reference

```
#include <logger.h>
```

Collaboration diagram for Logger:



#### Public Member Functions

- `Logger ()`
- `void debug (const QString &message) const`
- `void info (const QString &message) const`
- `void warn (const QString &message) const`
- `void error (const QString &message) const`
- `void print (const QString &message) const`
- `void stats (const Stats &stats) const`
- `void time (const QString &identifier, int milliseconds) const`

#### 1.13.1 Constructor & Destructor Documentation

##### 1.13.1.1 `Logger::Logger ( )`

#### 1.13.2 Member Function Documentation

1.13.2.1 `void Logger::debug ( const QString & message ) const`

1.13.2.2 `void Logger::error ( const QString & message ) const`

1.13.2.3 `void Logger::info ( const QString & message ) const`

1.13.2.4 `void Logger::print ( const QString & message ) const`

1.13.2.5 `void Logger::stats ( const Stats & stats ) const`

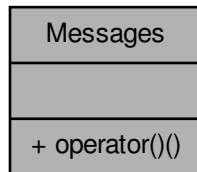
1.13.2.6 `void Logger::time ( const QString & identifier, int milliseconds ) const`

1.13.2.7 `void Logger::warn ( const QString & message ) const`

## 1.14 Messages Class Reference

```
#include <logger.h>
```

Collaboration diagram for Messages:



#### Public Member Functions

- QString operator() (const char \*text)

##### 1.14.1 Detailed Description

helper class for string literals

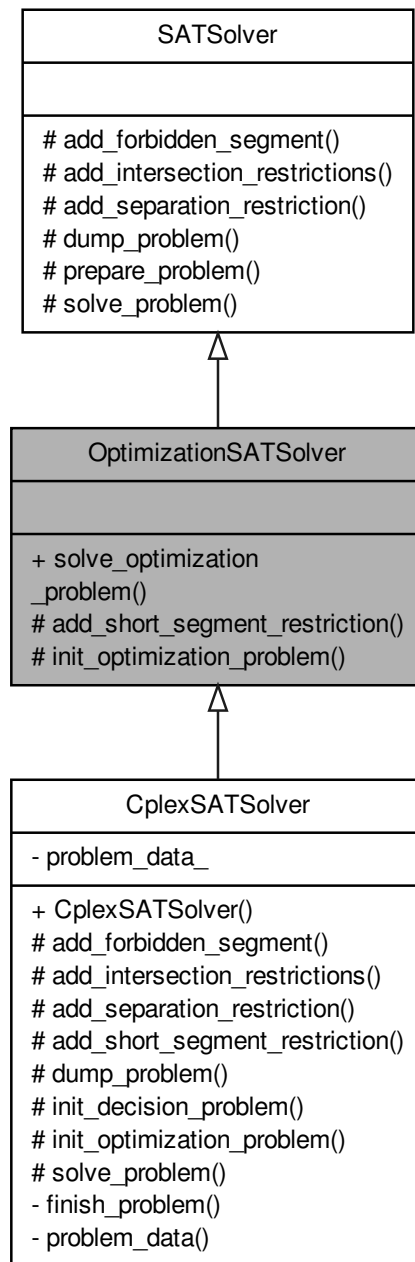
##### 1.14.2 Member Function Documentation

1.14.2.1 QString Messages::operator() ( const char \* *text* ) [inline]

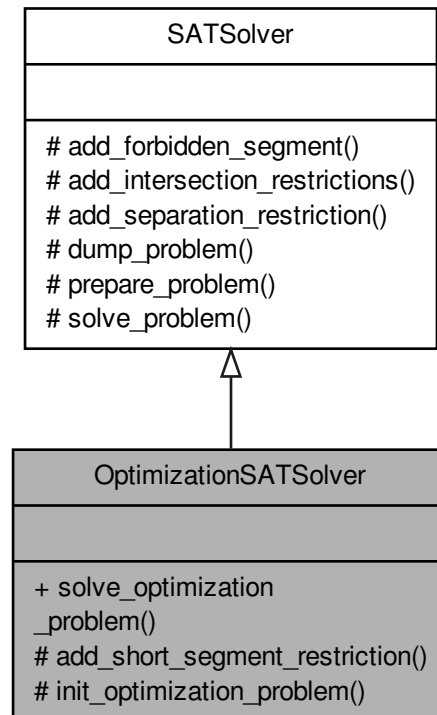
## 1.15 OptimizationSATSolver Class Reference

```
#include <sat_solver.h>
```

Inheritance diagram for OptimizationSATSolver:



Collaboration diagram for OptimizationSATSolver:



#### Public Member Functions

- void solve\_optimization\_problem (const QSettings &settings, const QString &file\_prefix, const SATProblem &problem, SATSolution &solution)

#### Protected Member Functions

- virtual void add\_short\_segment\_restriction (const SATProblem \*problem, const SegmentIndex &index)=0
- virtual void init\_optimization\_problem (const SATProblem \*problem)=0

#### 1.15.1 Detailed Description

interface for optimization SAT solvers

#### 1.15.2 Member Function Documentation

- 1.15.2.1 virtual void OptimizationSATSolver::add\_short\_segment\_restriction ( const SATProblem \* *problem*, const SegmentIndex & *index* ) [protected],[pure virtual]

Implemented in CplexSATSolver.

1.15.2.2 `virtual void OptimizationSATSolver::init_optimization_problem ( const SATProblem * problem )`  
`[protected], [pure virtual]`

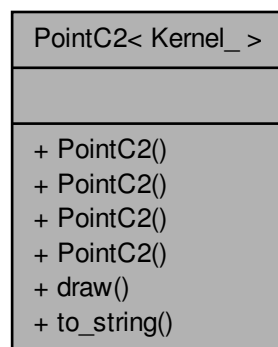
Implemented in CplexSATSolver.

1.15.2.3 `void OptimizationSATSolver::solve_optimization_problem ( const QSettings & settings, const QString & file_prefix,  
const SATProblem & problem, SATSolution & solution )`

## 1.16 PointC2< Kernel\_ > Class Template Reference

`#include <point.h>`

Collaboration diagram for PointC2< Kernel\_ >:



### Public Member Functions

- `PointC2 ()`
- `PointC2 (const CGAL::Origin &origin)`
- `PointC2 (const FT &x, const FT &y)`
- `PointC2 (const FT &hx, const FT &hy, const FT &hw)`
- `void draw (QPainter &painter) const`
- `QString to_string () const`

### Private Types

- `typedef Kernel_::FT FT`
- `typedef CGAL::PointC2< Kernel_ > PointBase`

### 1.16.1 Detailed Description

`template<class Kernel_>class PointC2< Kernel_ >`

customized point type



## 1.16.2 Member Typedef Documentation

1.16.2.1 `template<class Kernel_> typedef Kernel_::FT PointC2< Kernel_>::FT` [private]

1.16.2.2 `template<class Kernel_> typedef CGAL::PointC2<Kernel_> PointC2< Kernel_>::PointBase` [private]

## 1.16.3 Constructor &amp; Destructor Documentation

1.16.3.1 `template<class Kernel_> PointC2< Kernel_>::PointC2 ( )` [inline]

empty constructor

1.16.3.2 `template<class Kernel_> PointC2< Kernel_>::PointC2 ( const CGAL::Origin & origin )` [inline]

origin constructor

1.16.3.3 `template<class Kernel_> PointC2< Kernel_>::PointC2 ( const FT & x, const FT & y )` [inline]

Cartesian constructor

1.16.3.4 `template<class Kernel_> PointC2< Kernel_>::PointC2 ( const FT & hx, const FT & hy, const FT & hw )`  
[inline]

homogeneous constructor

## 1.16.4 Member Function Documentation

1.16.4.1 `template<class Kernel_> void PointC2< Kernel_>::draw ( QPainter & painter ) const`

draw segment using given QPainter

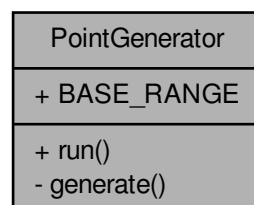
1.16.4.2 `template<class Kernel_> QString PointC2< Kernel_>::to_string ( ) const`

dump point to QString

## 1.17 PointGenerator Class Reference

`#include <point_generator.h>`

Collaboration diagram for PointGenerator:



**Static Public Member Functions**

- static void run (const QSettings &settings)

**Static Public Attributes**

- static const double BASE\_RANGE = 100.0

**Static Private Member Functions**

- template<typename GeneratorType >  
static void generate (const QString &base\_name, std::size\_t num\_points, std::size\_t num\_iterations)

**1.17.1 Member Function Documentation**

1.17.1.1 `template<typename GeneratorType > static void PointGenerator::generate ( const QString & base_name, std::size_t num_points, std::size_t num_iterations )` [inline],[static],[private]

1.17.1.2 `static void PointGenerator::run ( const QSettings & settings )` [inline],[static]

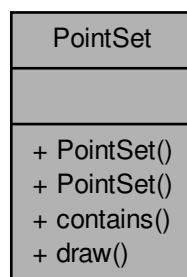
**1.17.2 Member Data Documentation**

1.17.2.1 `const double PointGenerator::BASE_RANGE = 100.0` [static]

**1.18 PointSet Class Reference**

```
#include <point_set.h>
```

Collaboration diagram for PointSet:

**Public Member Functions**

- PointSet ()
- PointSet (QFile &input\_file)
- bool contains (const Point &point) const
- void draw (QPainter &painter) const

### 1.18.1 Detailed Description

(sorted) set of points

### 1.18.2 Constructor & Destructor Documentation

#### 1.18.2.1 PointSet::PointSet ( )

empty set

#### 1.18.2.2 PointSet::PointSet ( QFile & *input\_file* )

read points from file

### 1.18.3 Member Function Documentation

#### 1.18.3.1 bool PointSet::contains ( const Point & *point* ) const [inline]

shortcut for STL count()

#### Returns

true if point is in set

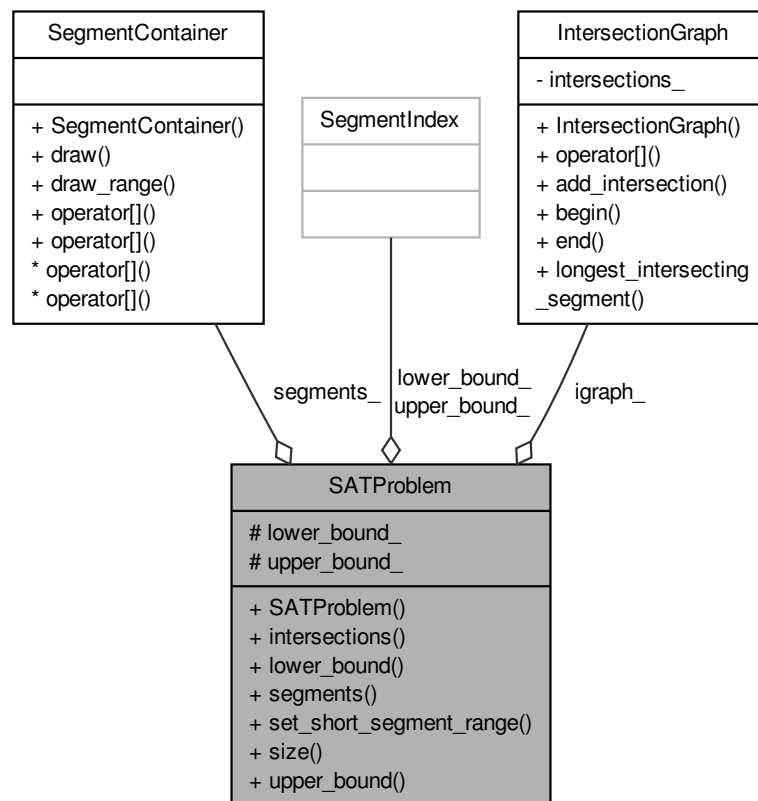
#### 1.18.3.2 void PointSet::draw ( QPainter & *painter* ) const

output point set using QPainter

## 1.19 SATProblem Class Reference

```
#include <sat_problem.h>
```

Collaboration diagram for SATProblem:



### Public Member Functions

- `SATProblem (const IntersectionGraph &igrph, const SegmentContainer &segments)`
- `const Intersections & intersections (const SegmentIndex &index) const`
- `const SegmentIndex & lower_bound () const`
- `const SegmentContainer & segments () const`
- `void set_short_segment_range (const SegmentIndex &lower_bound, const SegmentIndex &upper_bound)`
- `SegmentIndex size () const`
- `const SegmentIndex & upper_bound () const`

### Protected Attributes

- `const IntersectionGraph & igrph_`
- `const SegmentContainer & segments_`
- `SegmentIndex lower_bound_`
- `SegmentIndex upper_bound_`

#### 1.19.1 Constructor & Destructor Documentation

##### 1.19.1.1 SATProblem::SATProblem ( const IntersectionGraph & igrph, const SegmentContainer & segments )

default constructor

## 1.19.2 Member Function Documentation

1.19.2.1 `const Intersections& SATProblem::intersections ( const SegmentIndex & index ) const` `[inline]`

1.19.2.2 `const SegmentIndex& SATProblem::lower_bound ( ) const` `[inline]`

1.19.2.3 `const SegmentContainer& SATProblem::segments ( ) const` `[inline]`

1.19.2.4 `void SATProblem::set_short_segment_range ( const SegmentIndex & lower_bound, const SegmentIndex & upper_bound )`

set range of segments to consider

1.19.2.5 `SegmentIndex SATProblem::size ( ) const` `[inline]`

1.19.2.6 `const SegmentIndex& SATProblem::upper_bound ( ) const` `[inline]`

## 1.19.3 Member Data Documentation

1.19.3.1 `const IntersectionGraph& SATProblem::igraph_` `[protected]`

1.19.3.2 `SegmentIndex SATProblem::lower_bound_` `[protected]`

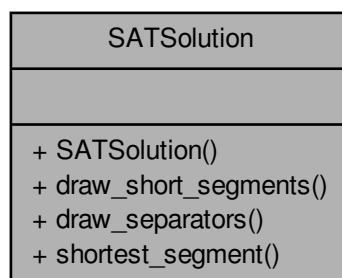
1.19.3.3 `const SegmentContainer& SATProblem::segments_` `[protected]`

1.19.3.4 `SegmentIndex SATProblem::upper_bound_` `[protected]`

## 1.20 SATSolution Class Reference

`#include <sat_solution.h>`

Collaboration diagram for SATSolution:



## Public Member Functions

- `SATSolution ()`
- `void draw_short_segments (QPainter &painter, const SegmentIndex &num_short_segments, const SegmentContainer &segments) const`
- `void draw_separators (QPainter &painter, const SegmentIndex &num_short_segments, const SegmentContainer &segments) const`
- `const SegmentIndex & shortest_segment () const`

### 1.20.1 Constructor & Destructor Documentation

1.20.1.1 SATSolution::SATSolution ( ) [inline]

### 1.20.2 Member Function Documentation

1.20.2.1 void SATSolution::draw\_separators ( QPainter & *painter*, const SegmentIndex & *num\_short\_segments*, const SegmentContainer & *segments* ) const

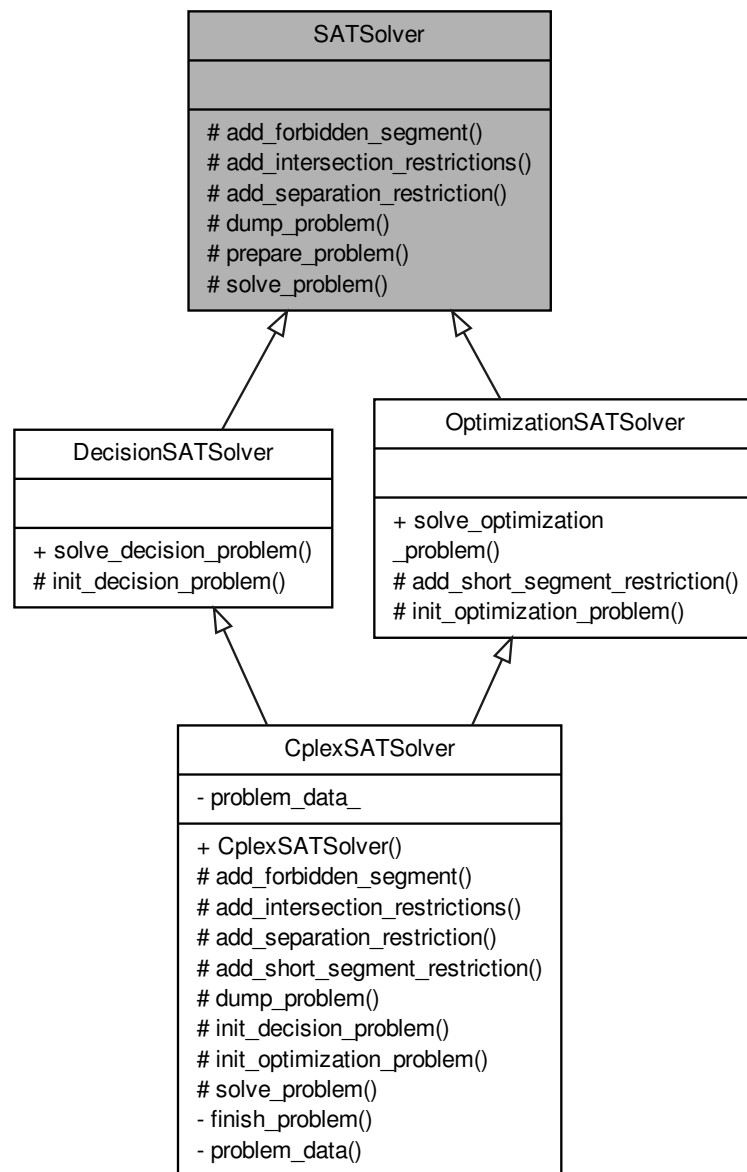
1.20.2.2 void SATSolution::draw\_short\_segments ( QPainter & *painter*, const SegmentIndex & *num\_short\_segments*, const SegmentContainer & *segments* ) const

1.20.2.3 const SegmentIndex & SATSolution::shortest\_segment ( ) const

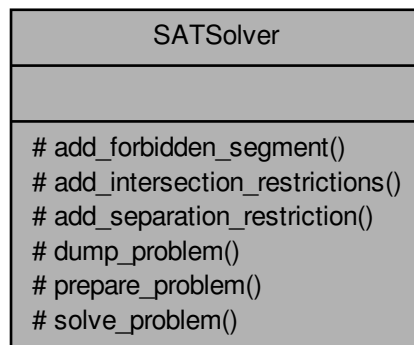
## 1.21 SATSolver Class Reference

```
#include <sat_solver.h>
```

Inheritance diagram for SATSolver:



Collaboration diagram for SATSolver:



#### Protected Member Functions

- virtual void add\_forbidden\_segment (const SATProblem \*problem, const SegmentIndex &index)=0
- virtual void add\_intersection\_restrictions (const SATProblem \*problem, const SegmentIndex &index, const Intersections &igroup)=0
- virtual void add\_separation\_restriction (const SATProblem \*problem, const SegmentIndex &index, const std::vector< SegmentIndex > &separators)=0
- virtual void dump\_problem (const QString &file\_prefix, const SATProblem \*problem)=0
- void prepare\_problem (const SATProblem &problem)
- virtual void solve\_problem (const SATProblem \*problem, SATSolution &solution)=0

#### 1.21.1 Detailed Description

interface for SAT solvers

#### 1.21.2 Member Function Documentation

**1.21.2.1** virtual void SATSolver::add\_forbidden\_segment ( const SATProblem \* *problem*, const SegmentIndex & *index* )  
[protected],[pure virtual]

Implemented in CplexSATSolver.

**1.21.2.2** virtual void SATSolver::add\_intersection\_restrictions ( const SATProblem \* *problem*, const SegmentIndex & *index*, const Intersections & *igroup* ) [protected],[pure virtual]

Implemented in CplexSATSolver.

**1.21.2.3** virtual void SATSolver::add\_separation\_restriction ( const SATProblem \* *problem*, const SegmentIndex & *index*, const std::vector< SegmentIndex > & *separators* ) [protected],[pure virtual]

Implemented in CplexSATSolver.

**1.21.2.4** virtual void SATSolver::dump\_problem ( const QString & *file\_prefix*, const SATProblem \* *problem* )  
[protected],[pure virtual]

Implemented in CplexSATSolver.



1.21.2.5 void SATSolver::prepare\_problem ( const SATProblem & *problem* ) [protected]

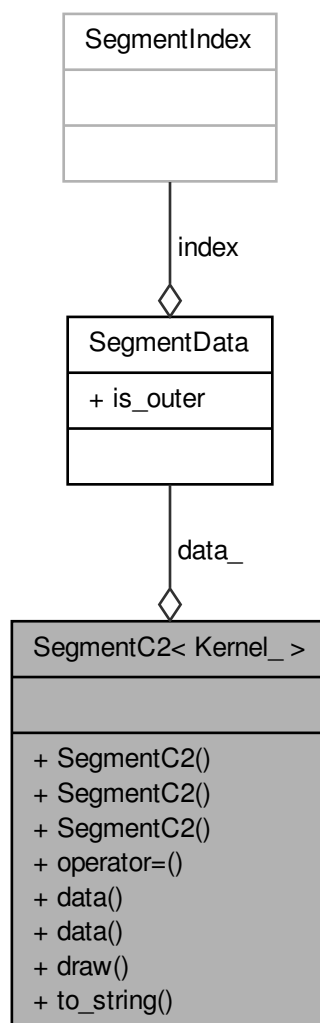
1.21.2.6 virtual void SATSolver::solve\_problem ( const SATProblem \* *problem*, SATSolution & *solution* )  
[protected],[pure virtual]

Implemented in CplexSATSolver.

## 1.22 SegmentC2< Kernel\_ > Class Template Reference

```
#include <segment.h>
```

Collaboration diagram for SegmentC2< Kernel\_ >:



### Public Member Functions

- SegmentC2 ()
- SegmentC2 (const Point\_2 &source, const Point\_2 &target)

- SegmentC2 (const SegmentC2 &other)
- SegmentC2 & operator= (const SegmentC2 &other)
- SegmentData & data ()
- const SegmentData & data () const
- void draw (QPainter &painter) const
- QString to\_string () const

#### Private Attributes

- SegmentData data\_

#### 1.22.1 Detailed Description

template<class Kernel\_>class SegmentC2< Kernel\_ >

customized segment type

#### 1.22.2 Constructor & Destructor Documentation

1.22.2.1 template<class Kernel\_> SegmentC2< Kernel\_ >::SegmentC2 ( ) [inline]

empty constructor

1.22.2.2 template<class Kernel\_> SegmentC2< Kernel\_ >::SegmentC2 ( const Point\_2 & source, const Point\_2 & target ) [inline]

base constructor

1.22.2.3 template<class Kernel\_> SegmentC2< Kernel\_ >::SegmentC2 ( const SegmentC2< Kernel\_ > & other ) [inline]

copy constructor

#### 1.22.3 Member Function Documentation

1.22.3.1 template<class Kernel\_> SegmentData& SegmentC2< Kernel\_ >::data ( ) [inline]

getter for attached data

1.22.3.2 template<class Kernel\_> const SegmentData& SegmentC2< Kernel\_ >::data ( ) const [inline]

constant getter for attached data

1.22.3.3 template<class Kernel\_> void SegmentC2< Kernel\_ >::draw ( QPainter & painter ) const

draw segment using given QPainter

1.22.3.4 template<class Kernel\_> SegmentC2& SegmentC2< Kernel\_ >::operator= ( const SegmentC2< Kernel\_ > & other ) [inline]

assignment operator

1.22.3.5 template<class Kernel\_> QString SegmentC2< Kernel\_ >::to\_string ( ) const

dump segment to QString

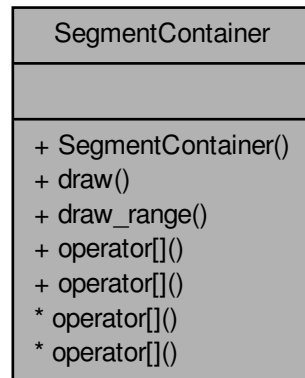
## 1.22.4 Member Data Documentation

1.22.4.1 `template<class Kernel_> SegmentData SegmentC2< Kernel_>::data_ [private]`

## 1.23 SegmentContainer Class Reference

```
#include <segment_container.h>
```

Collaboration diagram for SegmentContainer:



## Public Member Functions

- `SegmentContainer (const PointSet &points)`
- `void draw (QPainter &painter) const`
- `void draw_range (QPainter &painter, const SegmentIndex &lower_bound, const SegmentIndex &upper_bound) const`

**access i-th shortest segment**

*these operators assume that the segment set is not changed after construction*

- `Segment & operator[] (const SegmentIndex &index)`
- `const Segment & operator[] (const SegmentIndex &index) const`

## 1.23.1 Detailed Description

container of segments sorted by length

## 1.23.2 Constructor &amp; Destructor Documentation

1.23.2.1 `SegmentContainer::SegmentContainer ( const PointSet & points )`

construct segments for all point pairs from set

## 1.23.3 Member Function Documentation

1.23.3.1 void SegmentContainer::draw ( QPainter & *painter* ) const

draws all segments

1.23.3.2 void SegmentContainer::draw\_range ( QPainter & *painter*, const SegmentIndex & *lower\_bound*, const SegmentIndex & *upper\_bound* ) const

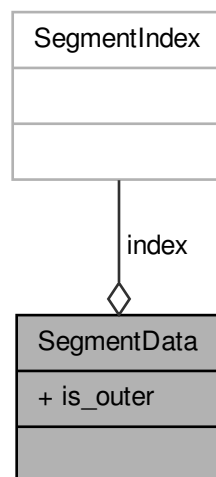
draw a range of segments

1.23.3.3 Segment & SegmentContainer::operator[] ( const SegmentIndex & *index* )1.23.3.4 const Segment & SegmentContainer::operator[] ( const SegmentIndex & *index* ) const

## 1.24 SegmentData Struct Reference

```
#include <segment.h>
```

Collaboration diagram for SegmentData:



## Public Attributes

- SegmentIndex index
- bool is\_outer

## 1.24.1 Detailed Description

data attached to a segment

## 1.24.2 Member Data Documentation

## 1.24.2.1 SegmentIndex SegmentData::index

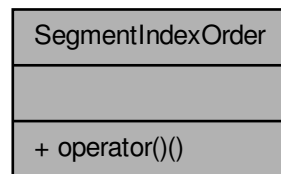
## 1.24.2.2 bool SegmentData::is\_outer

true if the segment includes another

## 1.25 SegmentIndexOrder Struct Reference

```
#include <orders.h>
```

Collaboration diagram for SegmentIndexOrder:



## Public Member Functions

- CGAL::Comparison\_result operator() (const Segment &s, const Segment &t) const

## 1.25.1 Detailed Description

CGAL order for Segment by index

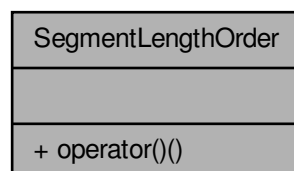
## 1.25.2 Member Function Documentation

1.25.2.1 CGAL::Comparison\_result SegmentIndexOrder::operator() ( const Segment & *s*, const Segment & *t* ) const

## 1.26 SegmentLengthOrder Struct Reference

```
#include <orders.h>
```

Collaboration diagram for SegmentLengthOrder:



## Public Member Functions

- `CGAL::Comparison_result operator() (const Segment &s, const Segment &t) const`

## 1.26.1 Detailed Description

CGAL order for Segment by length

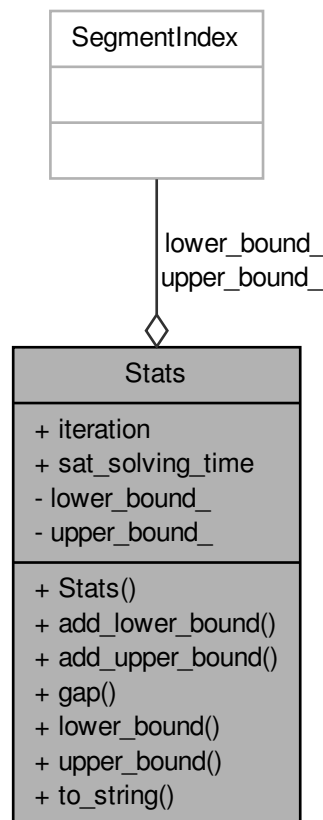
## 1.26.2 Member Function Documentation

1.26.2.1 `CGAL::Comparison_result SegmentLengthOrder::operator() ( const Segment & s, const Segment & t ) const`

## 1.27 Stats Class Reference

```
#include <stats.h>
```

Collaboration diagram for Stats:



## Public Member Functions

- `Stats ()`
- `void add_lower_bound (const SegmentIndex &bound)`

- void add\_upper\_bound (const SegmentIndex &bound)
- SegmentIndex gap () const
- const SegmentIndex & lower\_bound () const
- const SegmentIndex & upper\_bound () const
- QString to\_string () const

#### Public Attributes

- size\_t iteration
- quint64 sat\_solving\_time

#### Private Attributes

- SegmentIndex lower\_bound\_
- SegmentIndex upper\_bound\_

### 1.27.1 Constructor & Destructor Documentation

1.27.1.1 Stats::Stats ( ) [inline]

### 1.27.2 Member Function Documentation

1.27.2.1 void Stats::add\_lower\_bound ( const SegmentIndex & bound ) [inline]

1.27.2.2 void Stats::add\_upper\_bound ( const SegmentIndex & bound ) [inline]

1.27.2.3 SegmentIndex Stats::gap ( ) const [inline]

1.27.2.4 const SegmentIndex& Stats::lower\_bound ( ) const [inline]

1.27.2.5 QString Stats::to\_string ( ) const [inline]

1.27.2.6 const SegmentIndex& Stats::upper\_bound ( ) const [inline]

### 1.27.3 Member Data Documentation

1.27.3.1 size\_t Stats::iteration

1.27.3.2 SegmentIndex Stats::lower\_bound\_ [private]

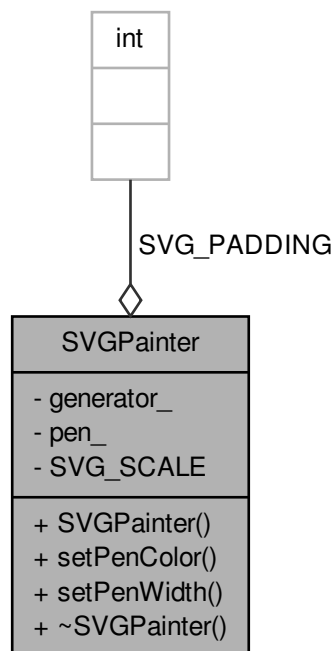
1.27.3.3 quint64 Stats::sat\_solving\_time

1.27.3.4 SegmentIndex Stats::upper\_bound\_ [private]

## 1.28 SVGPainter Class Reference

```
#include <svgPainter.h>
```

Collaboration diagram for SVGPainter:



#### Public Member Functions

- SVGPainter (const QString &file\_prefix, const QString &file\_name, const BoundingBox &bbox)
- void setPenColor (const QColor &color)
- void setPenWidth (int width)
- ~SVGPainter ()

#### Private Attributes

- QSvgGenerator generator\_
- QPen pen\_

#### Static Private Attributes

- static const int SVG\_PADDING = 10
- static const double SVG\_SCALE = 4.0

#### 1.28.1 Constructor & Destructor Documentation

1.28.1.1 SVGPainter::SVGPainter ( const QString & *file\_prefix*, const QString & *file\_name*, const BoundingBox & *bbox* )

1.28.1.2 SVGPainter::~~SVGPainter ( )

#### 1.28.2 Member Function Documentation



1.28.2.1 void SVGPainter::setPenColor ( const QColor & *color* )

1.28.2.2 void SVGPainter::setPenWidth ( int *width* )

### 1.28.3 Member Data Documentation

1.28.3.1 QSvgGenerator SVGPainter::generator\_ [private]

1.28.3.2 QPen SVGPainter::pen\_ [private]

1.28.3.3 const int SVGPainter::SVG\_PADDING = 10 [static], [private]

padding for SVG images

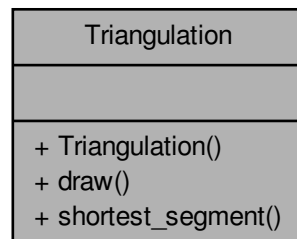
1.28.3.4 const double SVGPainter::SVG\_SCALE = 4.0 [static], [private]

scale for SVG images

## 1.29 Triangulation Class Reference

```
#include <triangulation.h>
```

Collaboration diagram for Triangulation:



### Public Member Functions

- Triangulation (const PointSet &points)
- void draw (QPainter &painter) const
- const SegmentIndex & shortest\_segment (const SegmentContainer &segments) const

### 1.29.1 Constructor & Destructor Documentation

1.29.1.1 Triangulation::Triangulation ( const PointSet & *points* )

default constructor

### 1.29.2 Member Function Documentation

1.29.2.1 void Triangulation::draw ( QPainter & *painter* ) const

draw triangulation segments using given QPainter

1.29.2.2 `const SegmentIndex & Triangulation::shortest_segment ( const SegmentContainer & segments ) const`