

SFA

0.1.0

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Chapter 1

Class Index

1.1 Class List

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Chapter 2

File Index

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Chapter 3

Class Documentation

3.1 Netlist::InitDataObj Struct Reference

Instantiate [Netlist](#) class.

```
#include <Netlist.h>
```

Public Attributes

- `std::vector< InitNet > netArray`
- `std::vector< InitInst > instArray`

3.1.1 Detailed Description

Instantiate [Netlist](#) class.

See also

[init\(InitDataObj &\).](#)

3.1.2 Member Data Documentation

3.1.2.1 instArray

```
std::vector<InitInst> Netlist::InitDataObj::instArray
```

3.1.2.2 netArray

```
std::vector<InitNet> Netlist::InitDataObj::netArray
```

The documentation for this struct was generated from the following file:

- [src/db/Netlist.h](#)

3.2 Netlist::InitInst Struct Reference

[Inst](#) for instantiation.

```
#include <Netlist.h>
```

Public Attributes

- [InstType](#) type = [InstType::OTHER](#)
- std::vector< [IndexType](#) > [netIdArray](#)
- std::string [name](#)
- [RealType](#) wid = 0
- [RealType](#) len = 0

3.2.1 Detailed Description

[Inst](#) for instantiation.

3.2.2 Member Data Documentation

3.2.2.1 len

```
RealType Netlist::InitInst::len = 0
```

3.2.2.2 name

```
std::string Netlist::InitInst::name
```


3.2.2.3 netIdArray

```
std::vector<IndexType> Netlist::InitInst::netIdArray
```

3.2.2.4 type

```
InstType Netlist::InitInst::type = InstType::OTHER
```

3.2.2.5 wid

```
RealType Netlist::InitInst::wid = 0
```

The documentation for this struct was generated from the following file:

- [src/db/Netlist.h](#)

3.3 Netlist::InitNet Struct Reference

[Net](#) for instantiation.

```
#include <Netlist.h>
```

Public Attributes

- std::string [name](#)
- [IndexType](#) [id](#) = [INDEX_TYPE_MAX](#)

3.3.1 Detailed Description

[Net](#) for instantiation.

3.3.2 Member Data Documentation

3.3.2.1 id

```
IndexType Netlist::InitNet::id = INDEX\_TYPE\_MAX
```

3.3.2.2 name

```
std::string Netlist::InitNet::name
```

The documentation for this struct was generated from the following file:

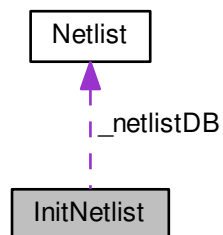
- [src/db/Netlist.h](#)

3.4 InitNetlist Class Reference

[InitNetlist](#) class.

```
#include <InitNetlist.h>
```

Collaboration diagram for InitNetlist:



Public Member Functions

- [InitNetlist](#) ()=default
Default Constructor.
- [InitNetlist](#) ([Netlist](#) &netlist)
Constructor with initialization.
- bool [read](#) (const std::string &filename)
Parse file and build netlist.

Private Attributes

- [Netlist](#) & [_netlistDB](#)

3.4.1 Detailed Description

[InitNetlist](#) class.

3.4.2 Constructor & Destructor Documentation

3.4.2.1 InitNetlist() [1/2]

```
InitNetlist::InitNetlist ( ) [explicit], [default]
```

Default Constructor.

3.4.2.2 InitNetlist() [2/2]

```
InitNetlist::InitNetlist (
    Netlist & netlist ) [inline], [explicit]
```

Constructor with initialization.

3.4.3 Member Function Documentation

3.4.3.1 read()

```
PROJECT_NAMESPACE_BEGIN bool InitNetlist::read (
    const std::string & filename )
```

Parse file and build netlist.

Input files should follow same format generated through scripts/create_init_obj.py. Sample input files for c++ are under benchmarks. The python scripts take standardized hspice/spectre netlist files as inputs.

Parameters

<i>filename</i>	Input file to parse.
-----------------	----------------------

3.4.4 Member Data Documentation

3.4.4.1 _netlistDB

```
Netlist& InitNetlist::_netlistDB [private]
```

The documentation for this class was generated from the following files:

- [src/parser/InitNetlist.h](#)
- [src/parser/InitNetlist.cpp](#)

3.5 Inst Class Reference

[Inst](#) class.

```
#include <Inst.h>
```

Public Member Functions

- [Inst](#) ()=default
Default constructor.
- [Inst](#) (const std::string &[name](#), [InstType](#) type, [IndexType](#) id)
Constructor for [Inst](#).
- [Inst](#) (const std::string &[name](#), [InstType](#) type, [IndexType](#) id, [RealType](#) wid, [RealType](#) len)
Constructor for [Inst](#).
- const std::string & [name](#) () const
- [InstType](#) type () const
Return type of [Inst](#).
- [IndexType](#) id () const
Return Id of [Inst](#).
- const std::vector< [IndexType](#) > & [pinIdArray](#) () const
Return the index array for pins of the [Inst](#).
- [RealType](#) wid () const
Return width of [Inst](#).
- [RealType](#) len () const
Return length of [Inst](#).
- void [addPinId](#) ([IndexType](#) pinId)
Add pin index to [Inst](#).
- void [setWid](#) ([RealType](#) wid)
Assign width of [Inst](#).
- void [setLen](#) ([RealType](#) len)
Assign length of [Inst](#).

Private Attributes

- std::string [_name](#)
- [InstType](#) [_type](#)
- [IndexType](#) [_id](#)
- std::vector< [IndexType](#) > [_pinIdArray](#)
- [RealType](#) [_wid](#)
- [RealType](#) [_len](#)

3.5.1 Detailed Description

[Inst](#) class.

3.5.2 Constructor & Destructor Documentation

3.5.2.1 Inst() [1/3]

```
Inst::Inst ( ) [explicit], [default]
```

Default constructor.

3.5.2.2 Inst() [2/3]

```
Inst::Inst (
    const std::string & name,
    InstType type,
    IndexType id ) [inline], [explicit]
```

Constructor for [Inst](#).

Constructor for netlist instances that does not have width and length attributes.

Parameters

<i>name</i>	Name of Inst .
<i>type</i>	Type of Inst . Member of InstType.

See also

[type.h](#)

Parameters

<i>id</i>	Id of Inst .
-----------	------------------------------

3.5.2.3 Inst() [3/3]

```
Inst::Inst (
    const std::string & name,
    InstType type,
    IndexType id,
    RealType wid,
    RealType len ) [inline], [explicit]
```

Constructor for [Inst](#).

Constructor for netlist instances that have width and length attributes.

Parameters

<i>name</i>	Name of Inst.
<i>type</i>	Type of Inst. Member of InstType.
<i>id</i>	Id of INst.
<i>wid</i>	Width of Inst.
<i>len</i>	Length of Inst.

3.5.3 Member Function Documentation

3.5.3.1 addPinId()

```
void Inst::addPinId (
    IndexType pinId ) [inline]
```

Add pin index to [Inst.](#)

Parameters

<i>pin↔ Id</i>	Added pin Id.
--------------------	---------------

3.5.3.2 id()

```
IndexType Inst::id ( ) const [inline]
```

Return Id of [Inst.](#)

3.5.3.3 len()

```
RealType Inst::len ( ) const [inline]
```

Return length of [Inst.](#)

3.5.3.4 name()

```
const std::string& Inst::name ( ) const [inline]
```

Return name of [Inst.](#)

3.5.3.5 pinIdArray()

```
const std::vector<IndexType>& Inst::pinIdArray ( ) const [inline]
```

Return the index array for pins of the [Inst](#).

3.5.3.6 setLen()

```
void Inst::setLen (
    RealType len ) [inline]
```

Assign length of [Inst](#).

3.5.3.7 setWid()

```
void Inst::setWid (
    RealType wid ) [inline]
```

Assign width of [Inst](#).

3.5.3.8 type()

```
InstType Inst::type ( ) const [inline]
```

Return type of [Inst](#).

See also

[InstType](#)

3.5.3.9 wid()

```
RealType Inst::wid ( ) const [inline]
```

Return width of [Inst](#).

3.5.4 Member Data Documentation

3.5.4.1 `_id`

```
IndexType Inst::_id [private]
```

3.5.4.2 `_len`

```
RealType Inst::_len [private]
```

3.5.4.3 `_name`

```
std::string Inst::_name [private]
```

3.5.4.4 `_pinIdArray`

```
std::vector<IndexType> Inst::_pinIdArray [private]
```

3.5.4.5 `_type`

```
InstType Inst::_type [private]
```

3.5.4.6 `_wid`

```
RealType Inst::_wid [private]
```

The documentation for this class was generated from the following file:

- `src/db/Inst.h`

3.6 MosPair Struct Reference

A pair of id for `Inst`.

```
#include <type.h>
```


Public Member Functions

- [MosPair](#) ([IndexType](#) Id1, [IndexType](#) Id2)
- int [operator==](#) (const [MosPair](#) &right) const

Public Attributes

- [IndexType](#) mosId1
- [IndexType](#) mosId2
- bool [valid](#) = true

3.6.1 Detailed Description

A pair of id for [Inst](#).

3.6.2 Constructor & Destructor Documentation

3.6.2.1 MosPair()

```
MosPair::MosPair (  
    IndexType Id1,  
    IndexType Id2 ) [inline]
```

Constructor

3.6.3 Member Function Documentation

3.6.3.1 operator==()

```
int MosPair::operator== (  
    const MosPair & right ) const [inline]
```

Equal operator.

Two pairs are equal if all Id are equal. Sequence does not matter.

3.6.4 Member Data Documentation

3.6.4.1 mosId1

`IndexType MosPair::mosId1`

Id1 of [Inst](#).

3.6.4.2 mosId2

`IndexType MosPair::mosId2`

Id2 of [Inst](#).

3.6.4.3 valid

`bool MosPair::valid = true`

Indicating if valid search pairs.

The documentation for this struct was generated from the following file:

- [src/global/type.h](#)

3.7 Net Class Reference

[Net](#) class.

```
#include <Net.h>
```

Public Member Functions

- [Net](#) ()=default
- [Net](#) (const std::string &[name](#), [IndexType](#) [id](#))
Constructor of [Net](#).
- const std::string & [name](#) () const
- [IndexType](#) [id](#) () const
- const std::vector< [IndexType](#) > & [pinIdArray](#) () const
- void [addPinId](#) ([IndexType](#) [pinId](#))
- [NetType](#) [netType](#) () const
Return net type.

Private Attributes

- std::string [_name](#)
- [IndexType](#) [_id](#)
- std::vector< [IndexType](#) > [_pinIdArray](#)

3.7.1 Detailed Description

[Net](#) class.

3.7.2 Constructor & Destructor Documentation

3.7.2.1 [Net\(\)](#) [1/2]

```
Net::Net ( ) [explicit], [default]
```

Default constructor.

3.7.2.2 [Net\(\)](#) [2/2]

```
Net::Net (
    const std::string & name,
    IndexType id ) [inline], [explicit]
```

Constructor of [Net](#).

Parameters

<i>name</i>	Name of Net .
<i>id</i>	Id of Net .

3.7.3 Member Function Documentation

3.7.3.1 [addPinId\(\)](#)

```
void Net::addPinId (
    IndexType pinId ) [inline]
```

Connect a pin to the net.

3.7.3.2 [id\(\)](#)

```
IndexType Net::id ( ) const [inline]
```

Return Id of [Net](#).

3.7.3.3 name()

```
const std::string& Net::name ( ) const [inline]
```

Return name of [Net](#).

3.7.3.4 netType()

```
NetType Net::netType ( ) const
```

Return net type.

See also

[NetType](#).

Return netType of net based on name. Currently supported Power/Ground names are limited to conventional VD↔D/VSS. Add unsupported names for Power/Ground filtering to POWER_NET_NAMES and GROUND_NET_NAMES to /db/Net.cpp.

3.7.3.5 pinIdArray()

```
const std::vector<IndexType>& Net::pinIdArray ( ) const [inline]
```

Return index array of connected pins.

3.7.4 Member Data Documentation

3.7.4.1 _id

```
IndexType Net::_id [private]
```

3.7.4.2 _name

```
std::string Net::_name [private]
```

3.7.4.3 _pinIdArray

```
std::vector<IndexType> Net::_pinIdArray [private]
```

The documentation for this class was generated from the following files:

- [src/db/Net.h](#)
- [src/db/Net.cpp](#)

3.8 Netlist Class Reference

[Netlist](#) class.

```
#include <Netlist.h>
```

Classes

- struct [InitDataObj](#)
Instantiate [Netlist](#) class.
- struct [InitInst](#)
[Inst](#) for instantiation.
- struct [InitNet](#)
[Net](#) for instantiation.

Public Member Functions

- [Netlist](#) ()=default
Default Constructor.
- void [init](#) ([InitDataObj](#) &obj)
Initialize [Netlist](#) class.
- void [print_all](#) () const
- bool [isMos](#) ([InstType](#) instType) const
Return true if [InstType](#) is a Mosfet. NMOS and PMOS are Mosfets.
- bool [isPasvDev](#) ([InstType](#) instType) const
Return true if [InstType](#) is passive device. RES and CAP are passive devices.
- bool [isSignal](#) ([IndexType](#) netId) const
Return true if corresponding net [NetType::Signal](#).
- [MosType](#) [mosType](#) ([IndexType](#) mosId) const
Return MosType of corresponding instance id.
- [IndexType](#) [instNetId](#) ([IndexType](#) instId, [PinType](#) pinType) const
Return Id of [Net](#) connected to [Inst](#) by certain [PinType](#).
- [IndexType](#) [instPinId](#) ([IndexType](#) instId, [PinType](#) pinType) const
Return Id of [Pin](#) with [PinType](#) connected to [Inst](#).
- [IndexType](#) [srcNetId](#) ([IndexType](#) mosId) const
Return Source [Net](#) Id of [Inst](#) mosId. Equivalent as [instNetId](#)(mosId, [PinType::SOURCE](#));.
- [IndexType](#) [drainNetId](#) ([IndexType](#) mosId) const
Return Drain [Net](#) Id of [Inst](#) mosId. Equivalent as [instNetId](#)(mosId, [PinType::DRAIN](#));.
- [IndexType](#) [gateNetId](#) ([IndexType](#) mosId) const

- Return Gate *Net* Id of *Inst* mosId. Equivalent as `instNetId(mosId, PinType::GATE);`.
- `PinType getPinTypeInstPinConn (IndexType instId, IndexType pinId) const`
Get *PinType* of a pin such that *Inst* and *Pin* are connected through this pin.
 - `PinType getPinTypeInstNetConn (IndexType instId, IndexType netId) const`
Get *PinType* of a pin such that *Inst* and *Net* are connected through this pin.
 - `void getInstNetConn (std::vector< IndexType > &instArray, IndexType netId) const`
Get all *Inst* that are connected to *netId*.
 - `void getInstPinConn (std::vector< IndexType > &instArray, IndexType pinId) const`
Get all *Inst* that are connected to *pinId*(through some net).
 - `void rmvInstHasPin (std::vector< IndexType > &instArray, IndexType pinId) const`
Remove from array, *Inst* that has *pinId*.
 - `void fltrInstPinConnPinType (std::vector< IndexType > &instArray, IndexType pinId, PinType connPinType) const`
Filter *instArray*. Remove *Inst* that are connected to *pinId* through *connPinType*.
 - `void fltrInstNetConnPinType (std::vector< IndexType > &instArray, IndexType netId, PinType connPinType) const`
Filter *instArray*. Remove *Inst* that are connected to *netId* through *connPinType*.
 - `void fltrInstMosType (std::vector< IndexType > &instArray, MosType mosType) const`
Filter *instArray*. Remove *Inst* whose type are *mosType*.
 - `const Pin & pin (IndexType id) const`
Return *Pin* of *Id*.
 - `const Net & net (IndexType id) const`
Return *Net* of *Id*.
 - `const Inst & inst (IndexType id) const`
Return *Inst* of *Id*.
 - `IndexType numPin () const`
Return number of *Pin*.
 - `IndexType numNet () const`
Return number of *Net*.
 - `IndexType numInst () const`
Return number of *Inst*.
 - `void addPin (Pin &pin)`
Add *Pin* to *Netlist*.
 - `void addNet (Net &net)`
Add *Net* to *Netlist*.
 - `void addInst (Inst &inst)`
Add *Inst* to *Netlist*.

Private Attributes

- `std::vector< Net > _netArray`
- `std::vector< Pin > _pinArray`
- `std::vector< Inst > _instArray`

3.8.1 Detailed Description

Netlist class.

3.8.2 Constructor & Destructor Documentation

3.8.2.1 Netlist()

```
Netlist::Netlist ( ) [explicit], [default]
```

Default Constructor.

3.8.3 Member Function Documentation

3.8.3.1 addInst()

```
void Netlist::addInst (
    Inst & inst ) [inline]
```

Add [Inst](#) to [Netlist](#).

3.8.3.2 addNet()

```
void Netlist::addNet (
    Net & net ) [inline]
```

Add [Net](#) to [Netlist](#).

3.8.3.3 addPin()

```
void Netlist::addPin (
    Pin & pin ) [inline]
```

Add [Pin](#) to [Netlist](#).

3.8.3.4 drainNetId()

```
IndexType Netlist::drainNetId (
    IndexType mosId ) const [inline]
```

Return Drain [Net](#) Id of [Inst](#) mosId. Equivalent as instNetId(mosId, PinType::DRAIN);.

See also

[instNetId](#)

3.8.3.5 fltrInstMosType()

```
void Netlist::fltrInstMosType (
    std::vector< IndexType > & instArray,
    MosType mosType ) const
```

Filter instArray. Remove [Inst](#) whose type are mosType.

Removed instId if mosType(instId) == mosType. O(n) complexity. Similar implementation of std::remove().

See also

[getPinTypeInstNetConn.](#)

3.8.3.6 fltrInstNetConnPinType()

```
void Netlist::fltrInstNetConnPinType (
    std::vector< IndexType > & instArray,
    IndexType netId,
    PinType connPinType ) const
```

Filter instArray. Remove [Inst](#) that are connected to netId through connPinType.

Removed instId if getPinTypeInstNetConn(instId, pinId) == connPinType. O(n) complexity. Similar implementation of std::remove().

See also

[getPinTypeInstNetConn.](#)

3.8.3.7 fltrInstPinConnPinType()

```
void Netlist::fltrInstPinConnPinType (
    std::vector< IndexType > & instArray,
    IndexType pinId,
    PinType connPinType ) const
```

Filter instArray. Remove [Inst](#) that are connected to pinId through connPinType.

Removed instId if getPinTypeInstPinConn(instId, pinId) == connPinType. O(n) complexity. Similar implementation of std::remove().

See also

[getPinTypeInstPinConn](#).

3.8.3.8 gateNetId()

```
IndexType Netlist::gateNetId (
    IndexType mosId ) const [inline]
```

Return Gate [Net](#) Id of [Inst](#) mosId. Equivalent as instNetId(mosId, PinType::GATE);.

See also

[instNetId](#).

3.8.3.9 getInstNetConn()

```
void Netlist::getInstNetConn (
    std::vector< IndexType > & instArray,
    IndexType netId ) const
```

Get all [Inst](#) that are connected to netId.

Parameters

out	<i>instArray</i>	Array of the returned Inst Id.
in	<i>netId</i>	Id of net.

3.8.3.10 getInstPinConn()

```
void Netlist::getInstPinConn (
```

```
std::vector< IndexType > & instArray,
IndexType pinId ) const
```

Get all [Inst](#) that are connected to pinId(through some net).

The instance that pinId itself belongs to is not returned.

Parameters

out	<i>instArray</i>	Array of the returned Inst Id.
in	<i>pinId</i>	Id of pin.

3.8.3.11 getPinTypeInstNetConn()

```
PinType Netlist::getPinTypeInstNetConn (
    IndexType instId,
    IndexType netId ) const
```

Get PinType of a pin such that [Inst](#) and [Net](#) are connected through this pin.

Example: Suppose pin[0] of inst[1] is connected to net[2]. getPinTypeInstNetConn(1,2) would return PinType of pin[0]. This function allows us to query for connection types and determine future search directions.

By definition this pin must belong to instId and be connected to netId. If no such pin exists [PinType::OTHER](#) is returned.

Parameters

<i>instId</i>	Id of Inst that returned pin is connected.
<i>netId</i>	Id of Net that returned pin is connected.

3.8.3.12 getPinTypeInstPinConn()

```
PinType Netlist::getPinTypeInstPinConn (
    IndexType instId,
    IndexType pinId ) const
```

Get PinType of a pin such that [Inst](#) and [Pin](#) are connected through this pin.

Example: Suppose pin[0] of inst[1] is connected to pin[2] (through some net). getPinTypeInstPinConn(1,2) would return PinType of pin[0]. This function allows us to query for connection types and determine future search directions.

By definition this pin must belong to instId and be connected to pinId through some net. If no such pin exists [PinType::OTHER](#) is returned.

Parameters

<i>inst↔ Id</i>	Id of Inst that returned pin is connected.
<i>pinId</i>	Id of Pin that returned pin is connected.

3.8.3.13 `init()`

```
void Netlist::init (
    InitDataObj & obj )
```

Initialize [Netlist](#) class.

3.8.3.14 `inst()`

```
const Inst& Netlist::inst (
    IndexType id ) const [inline]
```

Return [Inst](#) of Id.

3.8.3.15 `instNetId()`

```
IndexType Netlist::instNetId (
    IndexType instId,
    PinType pinType ) const
```

Return Id of [Net](#) connected to [Inst](#) by certain PinType.

Example: `instNetId(0, PinType::DRAIN)` would return the net index connected to `inst[0]` through a pin which [Pin↔Type::DRAIN](#). Or this returns `inst[0]` drain net. If the [Inst](#) does not have a PinType connected, `INDEX_TYPE_MAX` would be returned. Use at risk and only if InstType is known.

Parameters

<i>instId</i>	Id of Inst .
<i>pinType</i>	Returned Net Id connected to this PinType.

3.8.3.16 `instPinId()`

```
IndexType Netlist::instPinId (
```

```

    IndexType instId,
    PinType pinType ) const

```

Return Id of [Pin](#) with PinType connected to [Inst](#).

Example: `instPinId(0,PinType::DRAIN)` would return the pin index connected to `inst[0]` which is [PinType::DRAIN](#). Or this returns `inst[0]` drain pin index. If [Inst](#) does not have a PinType connected, `INDEX_TYPE_MAX` would be returned. Use at risk and only if `InstType` is known.

Parameters

<i>instId</i>	Id of Inst .
<i>pinType</i>	Returned Pin Id should be this PinType.

3.8.3.17 isMos()

```

bool Netlist::isMos (
    InstType instType ) const

```

Return true if `InstType` is a Mosfet. NMOS and PMOS are Mosfets.

3.8.3.18 isPasvDev()

```

bool Netlist::isPasvDev (
    InstType instType ) const

```

Return true if `InstType` is passive device. RES and CAP are passive devices.

3.8.3.19 isSignal()

```

bool Netlist::isSignal (
    IndexType netId ) const [inline]

```

Return true if corresponding net `NetType::Signal`.

3.8.3.20 mosType()

```

MosType Netlist::mosType (
    IndexType mosId ) const

```

Return `MosType` of corresponding instance id.

3.8.3.21 net()

```
const Net& Netlist::net (
    IndexType id ) const [inline]
```

Return [Net](#) of Id.

3.8.3.22 numInst()

```
IndexType Netlist::numInst ( ) const [inline]
```

Return number of [Inst](#).

3.8.3.23 numNet()

```
IndexType Netlist::numNet ( ) const [inline]
```

Return number of [Net](#).

3.8.3.24 numPin()

```
IndexType Netlist::numPin ( ) const [inline]
```

Return number of [Pin](#).

3.8.3.25 pin()

```
const Pin& Netlist::pin (
    IndexType id ) const [inline]
```

Return [Pin](#) of Id.

3.8.3.26 print_all()

```
void Netlist::print_all ( ) const
```

Print netlist.

3.8.3.27 rmvInstHasPin()

```
void Netlist::rmvInstHasPin (
    std::vector< IndexType > & instArray,
    IndexType pinId ) const
```

Remove from array, [Inst](#) that has pinId.

O(n) complexity guaranteed. Similar implementation of `std::remove()`.

Parameters

<i>instArray</i>	Reference to instance Id array.
<i>pinId</i>	Id of pin.

3.8.3.28 srcNetId()

```
IndexType Netlist::srcNetId (  
    IndexType mosId ) const [inline]
```

Return Source [Net](#) Id of [Inst](#) mosId. Equivalent as `instNetId(mosId, PinType::SOURCE);`.

See also

[instNetId](#).

3.8.4 Member Data Documentation

3.8.4.1 _instArray

```
std::vector<Inst> Netlist::_instArray [private]
```

3.8.4.2 _netArray

```
std::vector<Net> Netlist::_netArray [private]
```

3.8.4.3 _pinArray

```
std::vector<Pin> Netlist::_pinArray [private]
```

The documentation for this class was generated from the following files:

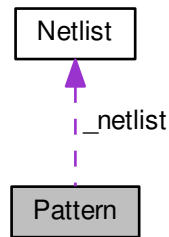
- [src/db/Netlist.h](#)
- [src/db/Netlist.cpp](#)

3.9 Pattern Class Reference

[Pattern](#) class.

```
#include <Pattern.h>
```

Collaboration diagram for Pattern:



Public Member Functions

- [Pattern](#) (const [Netlist](#) &netlist)
Constructor.
- [MosPattern](#) pattern ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return pattern for pair of mosfets.

Private Member Functions

- bool [matchedType](#) ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return true if [Inst](#) pair have same [InstType](#).
- bool [matchedSize](#) ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return true if [Inst](#) pair have same size attributes.
- bool [diffPairInput](#) ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return true if fits [MosPattern::DIFF_SOURCE](#).
- bool [diffPairCascocode](#) ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return true if fits [MosPattern::DIFF_CASCADE](#).
- bool [validPairCascocode](#) ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return true if fits [MosPattern::CASCADE](#).
- bool [validPairLoad](#) ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return true if fits [MosPattern::LOAD](#).
- bool [crossPairCascocode](#) ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return true if fits [MosPattern::CROSS_CASCADE](#).
- bool [crossPairLoad](#) ([IndexType](#) mosId1, [IndexType](#) mosId2) const
Return true if fits [MosPattern::CROSS_LOAD](#).

Private Attributes

- const [Netlist](#) & `_netlist`

3.9.1 Detailed Description

[Pattern](#) class.

3.9.2 Constructor & Destructor Documentation

3.9.2.1 Pattern()

```
Pattern::Pattern (
    const Netlist & netlist ) [inline], [explicit]
```

Constructor.

Parameters

<i>netlist</i>	Netlist for pattern search.
----------------	---

3.9.3 Member Function Documentation

3.9.3.1 crossPairCascode()

```
bool Pattern::crossPairCascode (
    IndexType mosId1,
    IndexType mosId2 ) const [private]
```

Return true if fits [MosPattern::CROSS_CASCADE](#).

3.9.3.2 crossPairLoad()

```
bool Pattern::crossPairLoad (
    IndexType mosId1,
    IndexType mosId2 ) const [private]
```

Return true if fits [MosPattern::CROSS_LOAD](#).

3.9.3.3 diffPairCascode()

```
bool Pattern::diffPairCascode (
    IndexType mosId1,
    IndexType mosId2 ) const [private]
```

Return true if fits [MosPattern::DIFF_CASCADE](#).

3.9.3.4 diffPairInput()

```
bool Pattern::diffPairInput (
    IndexType mosId1,
    IndexType mosId2 ) const [private]
```

Return true if fits [MosPattern::DIFF_SOURCE](#).

3.9.3.5 matchedSize()

```
bool Pattern::matchedSize (
    IndexType mosId1,
    IndexType mosId2 ) const [private]
```

Return true if [Inst](#) pair have same size attributes.

3.9.3.6 matchedType()

```
PROJECT_NAMESPACE_BEGIN bool Pattern::matchedType (
    IndexType mosId1,
    IndexType mosId2 ) const [private]
```

Return true if [Inst](#) pair have same InstType.

3.9.3.7 pattern()

```
MosPattern Pattern::pattern (
    IndexType mosId1,
    IndexType mosId2 ) const
```

Return pattern for pair of mosfets.

Valid patterns have same InstType. Currently they also have same size attribute.

TODO Add ratio pair detection in future.

See also

[MosPattern](#).

Parameters

<i>mosId1</i>	Id for mosfet.
<i>mosId2</i>	Id for mosfet.

3.9.3.8 validPairCascode()

```
bool Pattern::validPairCascode (
    IndexType mosId1,
    IndexType mosId2 ) const [private]
```

Return true if fits [MosPattern::CASCODE](#).

3.9.3.9 validPairLoad()

```
bool Pattern::validPairLoad (
    IndexType mosId1,
    IndexType mosId2 ) const [private]
```

Return true if fits [MosPattern::LOAD](#).

3.9.4 Member Data Documentation**3.9.4.1 _netlist**

```
const Netlist& Pattern::_netlist [private]
```

The documentation for this class was generated from the following files:

- src/sym_detect/[Pattern.h](#)
- src/sym_detect/[Pattern.cpp](#)

3.10 Pin Class Reference

[Pin](#) class.

```
#include <Pin.h>
```

Public Member Functions

- [Pin](#) ()=default
- [Pin](#) ([IndexType](#) id, [IndexType](#) instId, [IndexType](#) netId, [PinType](#) type)

Constructor for [Pin](#).

- [IndexType](#) id () const
- [IndexType](#) instId () const
- [IndexType](#) netId () const
- [PinType](#) type () const

Return type of [Pin](#).

Static Public Member Functions

- static [PinType](#) nextPinType ([PinType](#) type)

Return the next search PinType for DFS.

Private Attributes

- [IndexType](#) _id
- [IndexType](#) _instId
- [IndexType](#) _netId
- [PinType](#) _type

3.10.1 Detailed Description

[Pin](#) class.

3.10.2 Constructor & Destructor Documentation

3.10.2.1 [Pin\(\)](#) [1/2]

```
Pin::Pin ( ) [explicit], [default]
```

Default Constructor.

3.10.2.2 [Pin\(\)](#) [2/2]

```
Pin::Pin (
    IndexType id,
    IndexType instId,
    IndexType netId,
    PinType type ) [inline], [explicit]
```

Constructor for [Pin](#).

Parameters

<i>id</i>	Id of Pin .
<i>inst↔ Id</i>	Id of connected Inst .
<i>netId</i>	Id of connected Net .
<i>type</i>	Type of Pin .

3.10.3 Member Function Documentation

3.10.3.1 id()

```
IndexType Pin::id ( ) const [inline]
```

Return id of [Pin](#).

3.10.3.2 instId()

```
IndexType Pin::instId ( ) const [inline]
```

Return id of connected [Inst](#).

3.10.3.3 netId()

```
IndexType Pin::netId ( ) const [inline]
```

Return id of connected [Net](#).

3.10.3.4 nextPinType()

```
PROJECT_NAMESPACE_BEGIN PinType Pin::nextPinType (
    PinType type ) [static]
```

Return the next search PinType for DFS.

Parameters

<i>type</i>	Query the next search PinType.
-------------	--------------------------------

See also

[PinType](#)

The DFS search for symmetry relies on [Pin::nextPinType](#) to define the search path direction. For example, if a Mosfet was reached through a source then the DFS algorithm would search for connected [Inst](#) of the drain. Currently supported search paths:

Input PinType	nextPinType
SOURCE	DRAIN
DRAIN	SOURCE
THIS	THAT
THAT	THIS

3.10.3.5 type()

```
PinType Pin::type ( ) const [inline]
```

Return type of [Pin](#).

See also

[PinType](#)

3.10.4 Member Data Documentation

3.10.4.1 _id

```
IndexType Pin::_id [private]
```

3.10.4.2 _instId

```
IndexType Pin::_instId [private]
```

3.10.4.3 _netId

```
IndexType Pin::_netId [private]
```

3.10.4.4 `_type`

```
PinType Pin::_type [private]
```

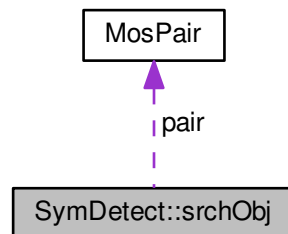
The documentation for this class was generated from the following files:

- `src/db/Pin.h`
- `src/db/Pin.cpp`

3.11 `SymDetect::srchObj` Struct Reference

Private object to assist DFS.

Collaboration diagram for `SymDetect::srchObj`:



Public Member Functions

- `srchObj (MosPair &diffPair, PinType pinType)`
Constructor.

Public Attributes

- `MosPair pair`
- `PinType srchPinType`

3.11.1 Detailed Description

Private object to assist DFS.

3.11.2 Constructor & Destructor Documentation

3.11.2.1 srchObj()

```
SymDetect::srchObj::srchObj (
    MosPair & diffPair,
    PinType pinType ) [inline]
```

Constructor.

3.11.3 Member Data Documentation

3.11.3.1 pair

```
MosPair SymDetect::srchObj::pair
```

Pair of mosfet that fits MosPattern. Note it is not a reference!

3.11.3.2 srchPinType

```
PinType SymDetect::srchObj::srchPinType
```

Indicate the pinType visited from last MosPair

The documentation for this struct was generated from the following file:

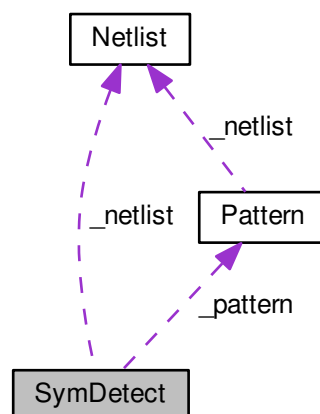
- src/sym_detect/SymDetect.h

3.12 SymDetect Class Reference

[SymDetect](#) class.

```
#include <SymDetect.h>
```

Collaboration diagram for SymDetect:



Classes

- struct [srchObj](#)

Private object to assist DFS.

Public Member Functions

- [SymDetect](#) (const [Netlist](#) &netlist)
Constructor Only needs netlist as input. [Pattern](#) class inherently constructed.
- void [hiSymDetect](#) (std::vector< std::vector< [MosPair](#) >> &symGroup) const
Hierarchy symmetry detection.

Private Member Functions

- [MosPattern](#) [srchObjPtrn](#) ([srchObj](#) &obj) const
Return pattern of [srchObj](#).
- bool [existPair](#) (std::vector< [MosPair](#) > &library, [IndexType](#) instId1, [IndexType](#) instId2) const
bool endSrch(IndexType mosId, PinType pinType) const;
- bool [existPair](#) (std::vector< [srchObj](#) > &library, [IndexType](#) instId1, [IndexType](#) instId2) const
Check if pair already reached.
- bool [endSrch](#) ([srchObj](#) &obj) const
Return true if end of search path.
- bool [validSrchObj](#) ([IndexType](#) instId1, [IndexType](#) instId2, [IndexType](#) srchPinId1, [IndexType](#) srchPinId2) const
Return true if a valid pair.
- void [pushNextSrchObj](#) (std::vector< [MosPair](#) > &dfsVstPair, std::vector< [srchObj](#) > &dfsStack, [srchObj](#) &currObj, std::vector< [MosPair](#) > &diffPairSrc) const
Push next valid [srchObj](#) to dfsStack.
- void [getDiffPairNetConn](#) (std::vector< [MosPair](#) > &diffPair, [IndexType](#) netId) const
Get DIFF_SOURCE [MosPair](#) connected to netId.
- void [getDiffPair](#) (std::vector< [MosPair](#) > &diffPair) const
Get DIFF_SOURCE of netlist.
- void [dfsDiffPair](#) (std::vector< [MosPair](#) > &dfsVstPair, [MosPair](#) &diffPair, std::vector< [MosPair](#) > &diffPair↔Srch) const
DFS search with given source. Visited [MosPair](#) are stored.
- void [inVldDiffPairSrch](#) (std::vector< [MosPair](#) > &diffPairSrch, [MosPair](#) &currPair) const
Invalidate visited pairs from sources.

Private Attributes

- const [Netlist](#) &_netlist
- [Pattern](#) _pattern

3.12.1 Detailed Description

[SymDetect](#) class.

3.12.2 Constructor & Destructor Documentation

3.12.2.1 SymDetect()

```
SymDetect::SymDetect (
    const Netlist & netlist ) [inline], [explicit]
```

Constructor Only needs netlist as input. [Pattern](#) class inherently constructed.

Parameters

<i>netlist</i>	Netlist class.
----------------	--------------------------------

3.12.3 Member Function Documentation

3.12.3.1 dfsDiffPair()

```
void SymDetect::dfsDiffPair (
    std::vector< MosPair > & dfsVstPair,
    MosPair & diffPair,
    std::vector< MosPair > & diffPairSrch ) const [private]
```

DFS search with given source. Visited [MosPair](#) are stored.

Search for symmetry patterns in DFS manner with search source as diffPair. Store visited valid [MosPair](#) at dfs↔VstPair. diffPairSrch are needed as input to invalidate reached sources. dfsVstPair would be in the same hierarchy symmetry group.

See also

[pushNextSrchObj](#)

Parameters

out	<i>dfsVstPair</i>	Vector to store all visited MosPair
in	<i>diffPair</i>	DFS search source
in	<i>diffPairSrch</i>	Vector of all stored DFS search source

3.12.3.2 endSrch()

```
bool SymDetect::endSrch (
    srchObj & obj ) const [private]
```

Return true if end of search path.

Current end search terminations: (1) DIFF_SOURCE reached through DRAIN (2) LOAD, CROSS_LOAD (3) gate connected pairs

3.12.3.3 existPair() [1/2]

```
bool SymDetect::existPair (
    std::vector< MosPair > & library,
    IndexType instId1,
    IndexType instId2 ) const [private]
```

bool endSrch(IndexType mosId, PinType pinType) const;

Check if pair already reached.

3.12.3.4 existPair() [2/2]

```
bool SymDetect::existPair (
    std::vector< srchObj > & library,
    IndexType instId1,
    IndexType instId2 ) const [private]
```

Check if pair already reached.

3.12.3.5 getDiffPair()

```
void SymDetect::getDiffPair (
    std::vector< MosPair > & diffPair ) const [private]
```

Get DIFF_SOURCE of netlist.

Iterate all signal nets for getDiffPairNetConn. This would return all DFS sources.

See also

[getDiffPairNetConn](#)

Parameters

<i>diffPair</i>	Store the output vector
-----------------	-------------------------

3.12.3.6 getDiffPairNetConn()

```
PROJECT_NAMESPACE_BEGIN void SymDetect::getDiffPairNetConn (
```

```
std::vector< MosPair > & diffPair,
IndexType netId ) const [private]
```

Get DIFF_SOURCE [MosPair](#) connected to netId.

Find [MosPair](#) that follow [MosPattern::DIFF_SOURCE](#) and the sources are both connected to netId. Theses [MosPair](#) are appended to diffPair.

Parameters

<i>netId</i>	Source should be connected to netId.
<i>diffPair</i>	Stored output vector.

3.12.3.7 hiSymDetect()

```
void SymDetect::hiSymDetect (
    std::vector< std::vector< MosPair >> & symGroup ) const
```

Hierarchy symmetry detection.

Output would contain 2 levels of hierarchy. symGroup is a vector of std::vector<MosPair> oneGroup. Where oneGroup is a group of [MosPair](#) in the same symmetry group. Each [MosPair](#) should follow a MosPattern.

Parameters

<i>symGroup</i>	Detected symmetry groups of netlist.
-----------------	--------------------------------------

See also

[MosPattern](#)
[MosPair](#)

3.12.3.8 inVldDiffPairSrch()

```
void SymDetect::inVldDiffPairSrch (
    std::vector< MosPair > & diffPairSrch,
    MosPair & currPair ) const [private]
```

Invalidate visited pairs from sources.

If a [MosPair](#) have already been visited and is a DFS source, it should be invalidated as a DFS search source to avoid revisiting.

Parameters

<i>diffPairSrch</i>	Vector of all DFS sources.
<i>currPair</i>	MosPair to invalidate.

3.12.3.9 pushNextSrchObj()

```
void SymDetect::pushNextSrchObj (
    std::vector< MosPair > & dfsVstPair,
    std::vector< srchObj > & dfsStack,
    srchObj & currObj,
    std::vector< MosPair > & diffPairSrc ) const [private]
```

Push next valid [srchObj](#) to dfsStack.

This function push valid pairs that could be reached from currObj to dfsStack. It also removes reached DIFF_SOURCE [MosPair](#) from diffPairSrc.

See also

[inVldDiffPairSrch](#).

Parameters

<i>dfsVstPair</i>	All current visited MosPair
<i>dfsStack</i>	Stack to store to visit MosPair
<i>currObj</i>	Current srchObj under visit
<i>diffPairSrc</i>	All DFS sources

3.12.3.10 srchObjPtrn()

```
MosPattern SymDetect::srchObjPtrn (
    srchObj & obj ) const [private]
```

Return pattern of [srchObj](#).

3.12.3.11 validSrchObj()

```
bool SymDetect::validSrchObj (
    IndexType instId1,
    IndexType instId2,
    IndexType srchPinId1,
    IndexType srchPinId2 ) const [private]
```

Return true if a valid pair.

Valid pairs have following attributes: (1) Reached through same PinType (2) Not reached through gate (3) Valid MosPattern

Parameters

<i>instld1</i>	Reached pair instld1
<i>instld2</i>	Reached pair instld2
<i>srchPinld1</i>	instld1 reached by srchPinld1.
<i>srchPinld2</i>	instld2 reached by srchPinld2.

3.12.4 Member Data Documentation

3.12.4.1 `_netlist`

```
const Netlist& SymDetect::_netlist [private]
```

3.12.4.2 `_pattern`

```
Pattern SymDetect::_pattern [private]
```

The documentation for this class was generated from the following files:

- [src/sym_detect/SymDetect.h](#)
- [src/sym_detect/SymDetect.cpp](#)

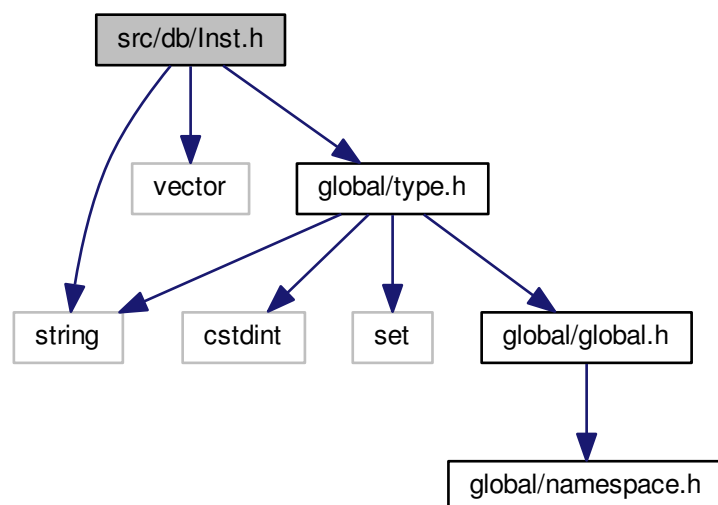
Chapter 4

File Documentation

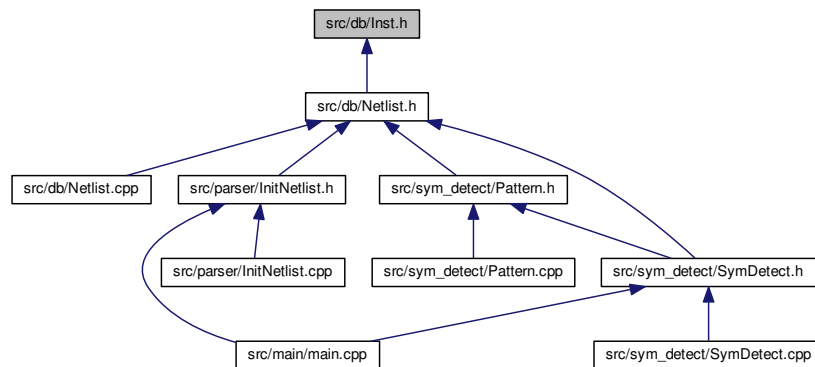
4.1 src/db/Inst.h File Reference

Instance class.

```
#include <string>
#include <vector>
#include "global/type.h"
Include dependency graph for Inst.h:
```



This graph shows which files directly or indirectly include this file:



Classes

- class [Inst](#)
Inst class.

4.1.1 Detailed Description

Instance class.

Author

Mingjie Liu

Date

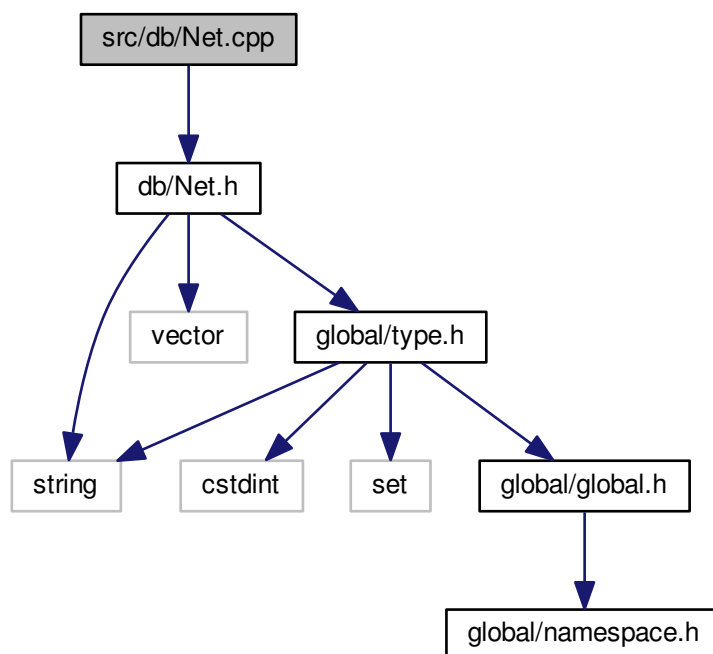
11/24/2018

4.2 src/db/Net.cpp File Reference

[Net](#) class implementation.


```
#include "db/Net.h"
```

Include dependency graph for Net.cpp:



Variables

- static `PROJECT_NAMESPACE_BEGIN` `const std::set< std::string > POWER_NET_NAMES = {"vdd", "VDD", "Vdd", "VDDA", "vdda", "Vdda"}`
- static `const std::set< std::string > GROUND_NET_NAMES = {"vss", "VSS", "Vss", "VSSA", "vssa", "Vssa", "gnd", "Gnd", "GND"}`

4.2.1 Detailed Description

`Net` class implementation.

Author

Mingjie Liu

Date

11/24/2018

4.2.2 Variable Documentation

4.2.2.1 GROUND_NET_NAMES

```
const std::set<std::string> GROUND_NET_NAMES = {"vss", "VSS", "Vss", "VSSA", "vssa", "Vssa",
"gn", "Gnd", "GND"} [static]
```

A set of possible ground net names.

4.2.2.2 POWER_NET_NAMES

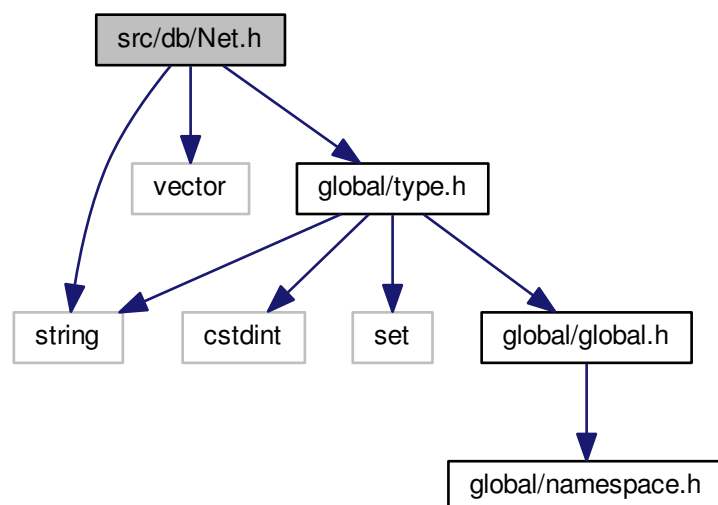
```
PROJECT_NAMESPACE_BEGIN const std::set<std::string> POWER_NET_NAMES = {"vdd", "VDD", "Vdd",
"VDDA", "vdda", "Vdda"} [static]
```

A set of possible power net names.

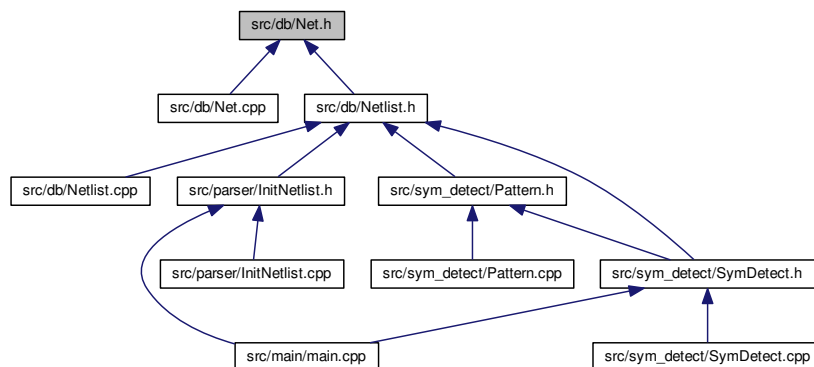
4.3 src/db/Net.h File Reference

[Net](#) class.

```
#include <string>
#include <vector>
#include "global/type.h"
Include dependency graph for Net.h:
```



This graph shows which files directly or indirectly include this file:



Classes

- class [Net](#)
Net class.

4.3.1 Detailed Description

[Net](#) class.

Author

Mingjie Liu

Date

11/24/2018

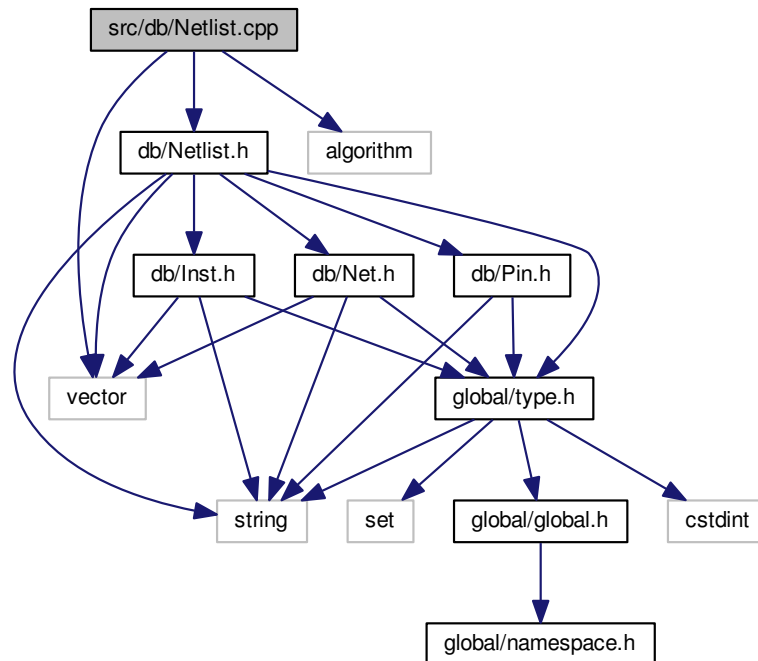
4.4 src/db/Netlist.cpp File Reference

[Netlist](#) class implementation.

```
#include "db/Netlist.h"
#include <vector>
```

```
#include <algorithm>
```

Include dependency graph for Netlist.cpp:



Variables

- static `PROJECT_NAMESPACE_BEGIN` const `PinType` `MOS_PIN_TYPE` [4] = {`PinType::DRAIN`, `PinType::GATE`, `PinType::SOURCE`, `PinType::BULK`}
Mos Pin Types.
- static const `PinType` `RES_PIN_TYPE` [3] = {`PinType::THIS`, `PinType::THAT`, `PinType::OTHER`}
Res/Cap Pin Types.

4.4.1 Detailed Description

`Netlist` class implementation.

Author

Mingjie Liu

Date

11/24/2018

4.4.2 Variable Documentation

4.4.2.1 MOS_PIN_TYPE

```
PROJECT_NAMESPACE_BEGIN const PinType MOS_PIN_TYPE[4] = {PinType::DRAIN, PinType::GATE, PinType::SOURCE, PinType::BULK} [static]
```

Mos Pin Types.

4.4.2.2 RES_PIN_TYPE

```
const PinType RES_PIN_TYPE[3] = {PinType::THIS, PinType::THAT, PinType::OTHER} [static]
```

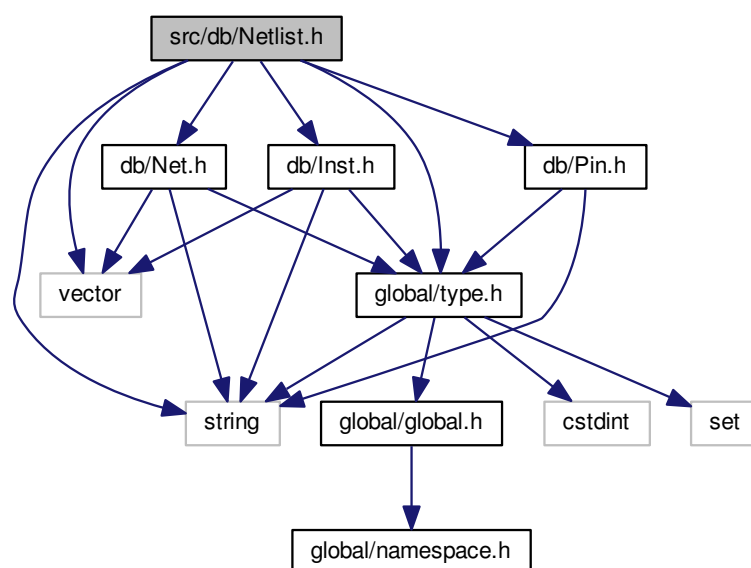
Res/Cap Pin Types.

4.5 src/db/Netlist.h File Reference

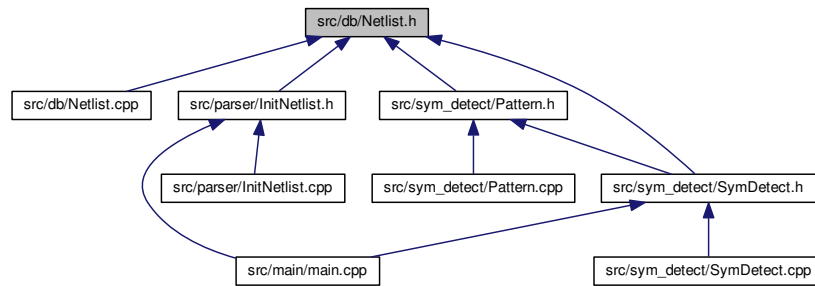
Netlist class.

```
#include <vector>
#include <string>
#include "global/type.h"
#include "db/Net.h"
#include "db/Pin.h"
#include "db/Inst.h"
```

Include dependency graph for Netlist.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [Netlist](#)
Netlist class.
- struct [Netlist::InitNet](#)
Net for instantiation.
- struct [Netlist::InitInst](#)
Inst for instantiation.
- struct [Netlist::InitDataObj](#)
Instantiate *Netlist* class.

4.5.1 Detailed Description

[Netlist](#) class.

Author

Mingjie Liu

Date

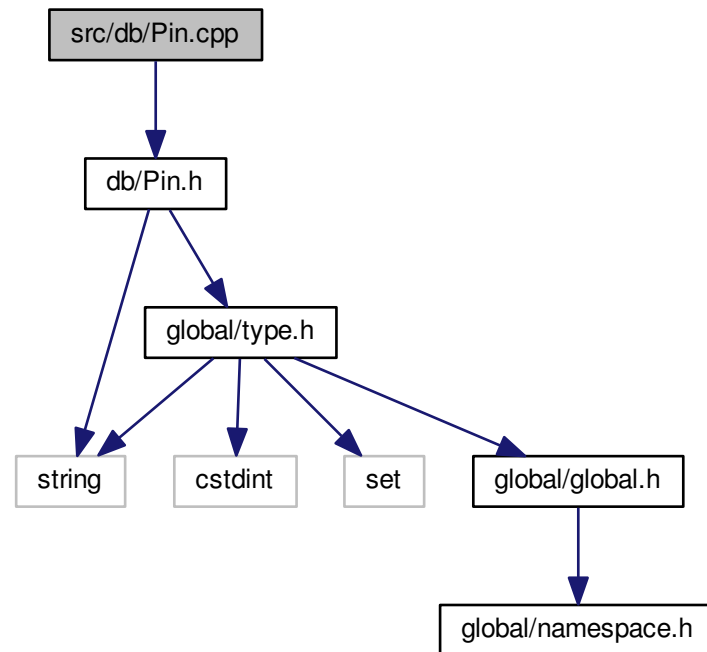
11/24/2018

4.6 src/db/Pin.cpp File Reference

[Net](#) class implementation.

```
#include "db/Pin.h"
```

Include dependency graph for Pin.cpp:



4.6.1 Detailed Description

[Net](#) class implementation.

Author

Mingjie Liu

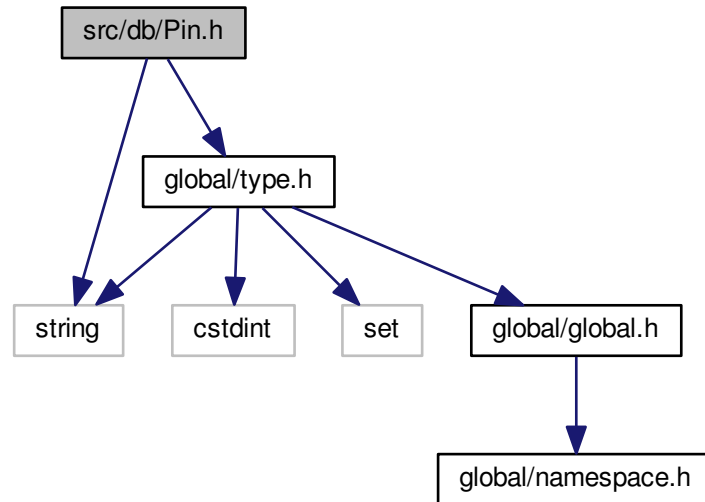
Date

11/24/2018

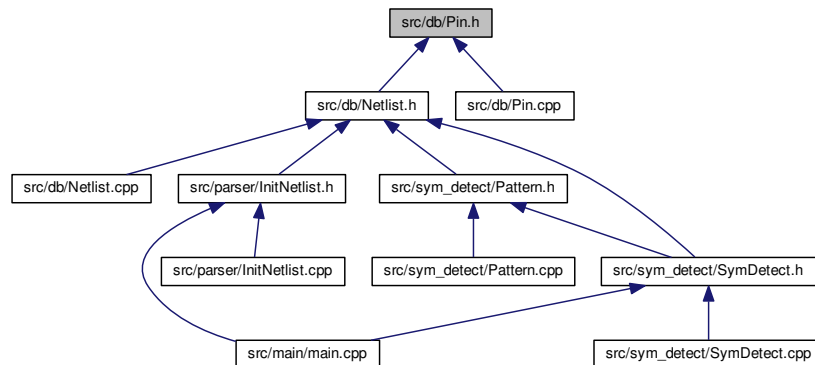
4.7 src/db/Pin.h File Reference

[Pin](#) class.

```
#include <string>
#include "global/type.h"
Include dependency graph for Pin.h:
```



This graph shows which files directly or indirectly include this file:



Classes

- class [Pin](#)
Pin class.

4.7.1 Detailed Description

[Pin](#) class.

Author

Mingjie Liu

Date

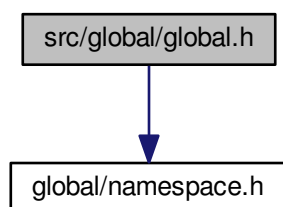
11/24/2018

4.8 src/global/global.h File Reference

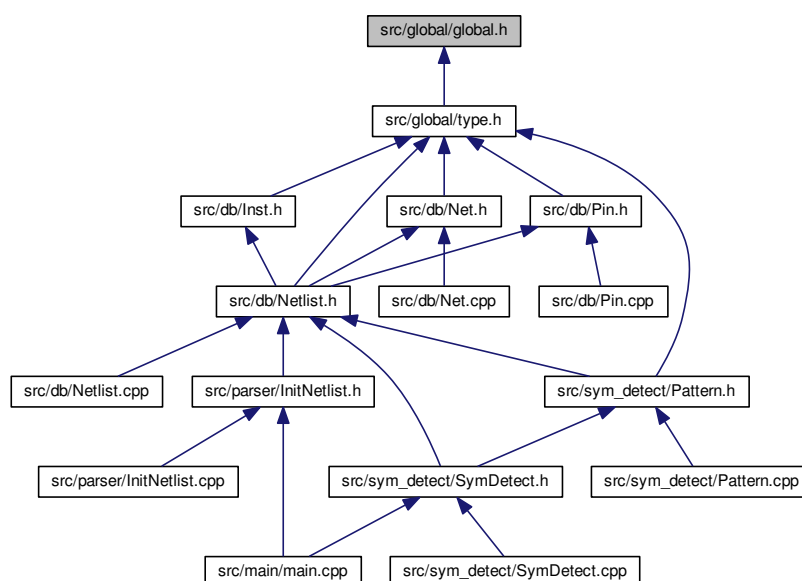
Global header file.

```
#include "global/namespace.h"
```

Include dependency graph for global.h:



This graph shows which files directly or indirectly include this file:



4.9.1 Detailed Description

Namespace header file.

Author

Mingjie Liu

Date

11/24/2018

4.9.2 Macro Definition Documentation

4.9.2.1 PROJECT_NAMESPACE

```
#define PROJECT_NAMESPACE SFA
```

4.9.2.2 PROJECT_NAMESPACE_BEGIN

```
#define PROJECT_NAMESPACE_BEGIN namespace PROJECT_NAMESPACE {
```

4.9.2.3 PROJECT_NAMESPACE_END

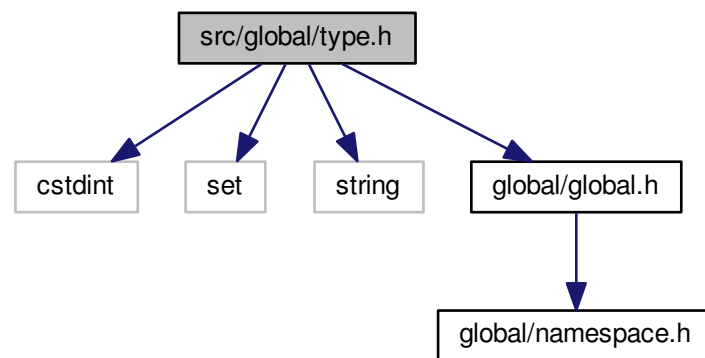
```
#define PROJECT_NAMESPACE_END }
```

4.10 src/global/type.h File Reference

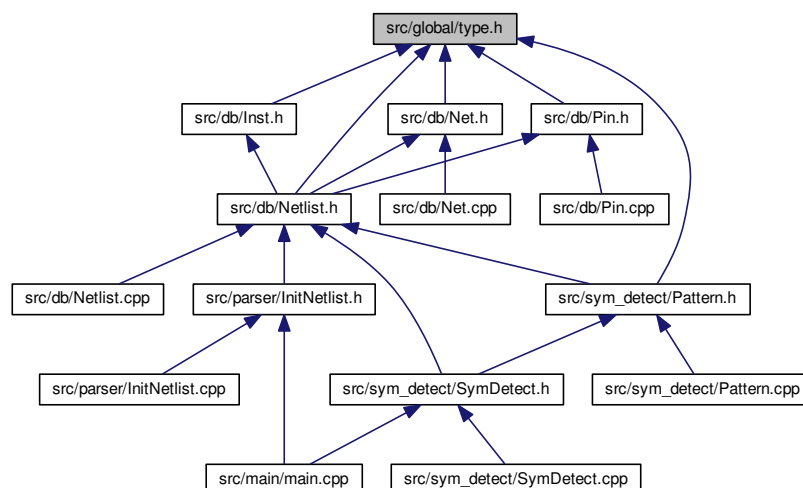
Type header file.

```
#include <cstdint>
#include <set>
#include <string>
#include "global/global.h"
```

Include dependency graph for type.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct [MosPair](#)
A pair of id for [Inst](#).

Typedefs

- using `IndexType` = `std::uint32_t`
- using `IntType` = `std::int32_t`
- using `RealType` = `double`
- using `Byte` = `std::uint8_t`

Enumerations

- enum `InstType` : `Byte` {
`InstType::RES`, `InstType::PMOS`, `InstType::NMOS`, `InstType::CAP`,
`InstType::OTHER` }
Type of `Inst`.
- enum `NetType` : `Byte` { `NetType::POWER`, `NetType::GROUND`, `NetType::SIGNAL` }
Type of `Net`.
- enum `PinType` : `Byte` {
`PinType::SOURCE`, `PinType::DRAIN`, `PinType::GATE`, `PinType::BULK`,
`PinType::THIS`, `PinType::THAT`, `PinType::OTHER` }
Type of `Pin`.
- enum `MosType` : `Byte` { `MosType::DIFF`, `MosType::DIODE`, `MosType::CAP`, `MosType::DUMMY` }
Connection type of Mosfet.
- enum `MosPattern` : `Byte` {
`MosPattern::DIFF_SOURCE`, `MosPattern::DIFF_CASCADE`, `MosPattern::CASCADE`, `MosPattern::LOAD`,
`MosPattern::CROSS_CASCADE`, `MosPattern::CROSS_LOAD`, `MosPattern::INVALID` }
Pattern for pair of Mosfet.

Variables

- constexpr `IndexType` `INDEX_TYPE_MAX` = 1000000000
- constexpr `IntType` `INT_TYPE_MAX` = 1000000000
- constexpr `IntType` `INT_TYPE_MIN` = -1000000000
- constexpr `RealType` `REAL_TYPE_MAX` = 1e100
- constexpr `RealType` `REAL_TYPE_MIN` = -1e100
- constexpr `RealType` `REAL_TYPE_TOL` = 1e-6

4.10.1 Detailed Description

Type header file.

Author

Mingjie Liu

Date

11/24/2018

4.10.2 Typedef Documentation

4.10.2.1 Byte

```
using Byte = std::uint8_t
```

4.10.2.2 IndexType

```
using IndexType = std::uint32_t
```

4.10.2.3 IntType

```
using IntType = std::int32_t
```

4.10.2.4 RealType

```
using RealType = double
```

4.10.3 Enumeration Type Documentation

4.10.3.1 InstType

```
enum InstType : Byte [strong]
```

Type of `Inst`.

Enumerator

RES	Resistor
PMOS	PMos
NMOS	NMos
CAP	Capacitor
OTHER	Other

4.10.3.2 MosPattern

```
enum MosPattern : Byte [strong]
```

[Pattern](#) for pair of Mosfet.

See also

[Pattern::pattern\(\)](#)

Enumerator

DIFF_SOURCE	Source connected diff pair.
DIFF_CASCODE	Cascode diff pair.
CASCODE	Gate connected cascode pair.
LOAD	Cascode pair with source connected to Power/Ground.
CROSS_CASCODE	Cross coupled cascode pair.
CROSS_LOAD	Cross coupled load.
INVALID	No pattern detected.

4.10.3.3 MosType

```
enum MosType : Byte [strong]
```

Connection type of Mosfet.

See also

[Netlist::mosType\(\)](#).

Enumerator

DIFF	D/G/S diff
DIODE	G/D connected
CAP	G/S connected
DUMMY	D/S connected

4.10.3.4 NetType

```
enum NetType : Byte [strong]
```

Type of [Net](#).

Enumerator

POWER	Power
GROUND	Ground
SIGNAL	Signal

4.10.3.5 PinType

```
enum PinType : Byte [strong]
```

Type of [Pin](#).

Enumerator

SOURCE	Inst is Mosfet
DRAIN	Inst is Mosfet
GATE	Inst is Mosfet
BULK	Inst is Mosfet
THIS	Inst is Passive
THAT	Inst is Passive
OTHER	Other

4.10.4 Variable Documentation

4.10.4.1 INDEX_TYPE_MAX

```
constexpr IndexType INDEX_TYPE_MAX = 1000000000
```

4.10.4.2 INT_TYPE_MAX

```
constexpr IntType INT_TYPE_MAX = 1000000000
```

4.10.4.3 INT_TYPE_MIN

```
constexpr IntType INT_TYPE_MIN = -1000000000
```

4.10.4.4 REAL_TYPE_MAX

```
constexpr RealType REAL_TYPE_MAX = 1e100
```


4.10.4.5 REAL_TYPE_MIN

```
constexpr RealType REAL_TYPE_MIN = -1e100
```

4.10.4.6 REAL_TYPE_TOL

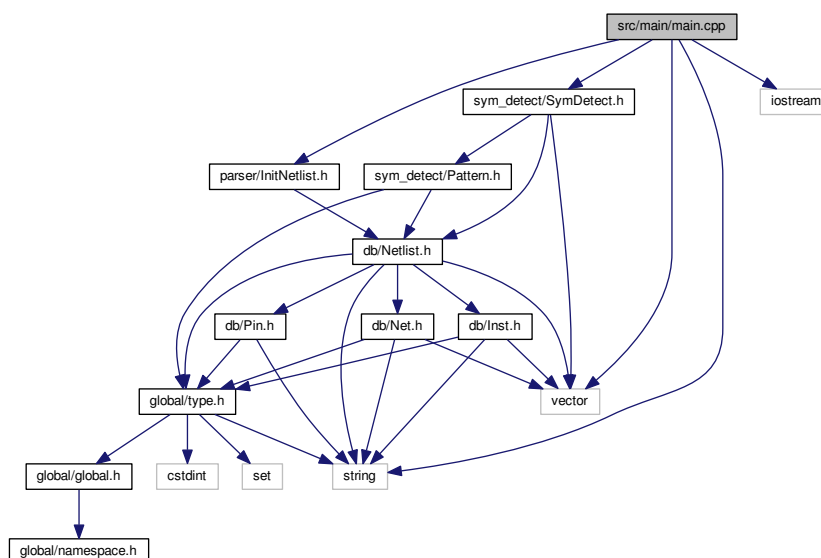
```
constexpr RealType REAL_TYPE_TOL = 1e-6
```

4.11 src/main/main.cpp File Reference

main.cpp

```
#include <string>
#include <iostream>
#include <vector>
#include "parser/InitNetlist.h"
#include "sym_detect/SymDetect.h"
```

Include dependency graph for main.cpp:



Macros

- #define `__SFA_TEST__`

Functions

- int `main` (int argc, char *argv[])

4.11.1 Detailed Description

[main.cpp](#)

Author

Mingjie Liu

Date

11/25/2018

Takes 1 argument input. Parse the file into [Netlist](#). Detect hierarchy symmetry groups and print to command line. Input file should be of certain format. See [parser/InitNetlist.h](#) for details.

4.11.2 Macro Definition Documentation

4.11.2.1 __SFA_TEST__

```
#define __SFA_TEST__
```

4.11.3 Function Documentation

4.11.3.1 main()

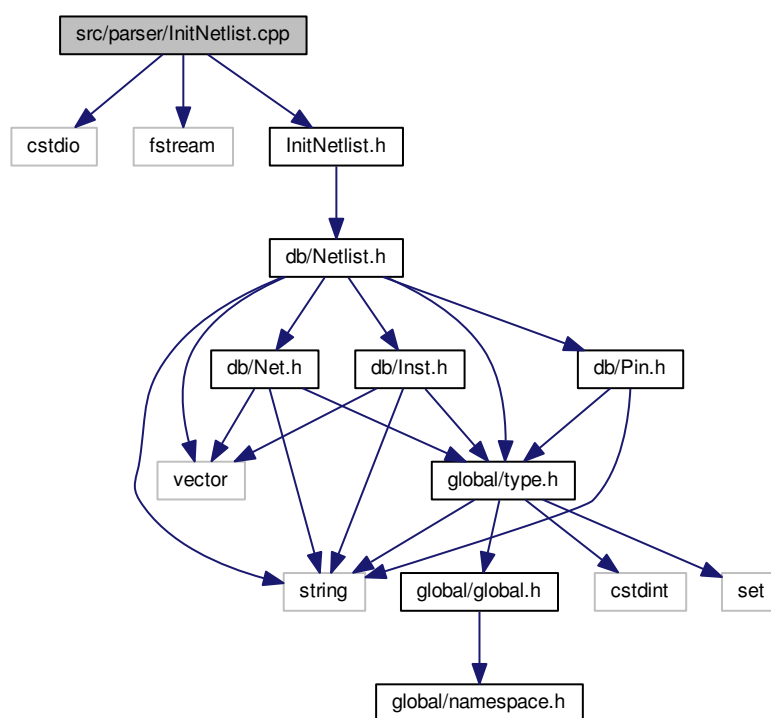
```
int main (
    int argc,
    char * argv[] )
```

4.12 src/parser/InitNetlist.cpp File Reference

Parser implementation.

```
#include <cstdio>
#include <fstream>
#include "InitNetlist.h"
```

Include dependency graph for InitNetlist.cpp:



4.12.1 Detailed Description

Parser implementation.

Author

Mingjie Liu

Date

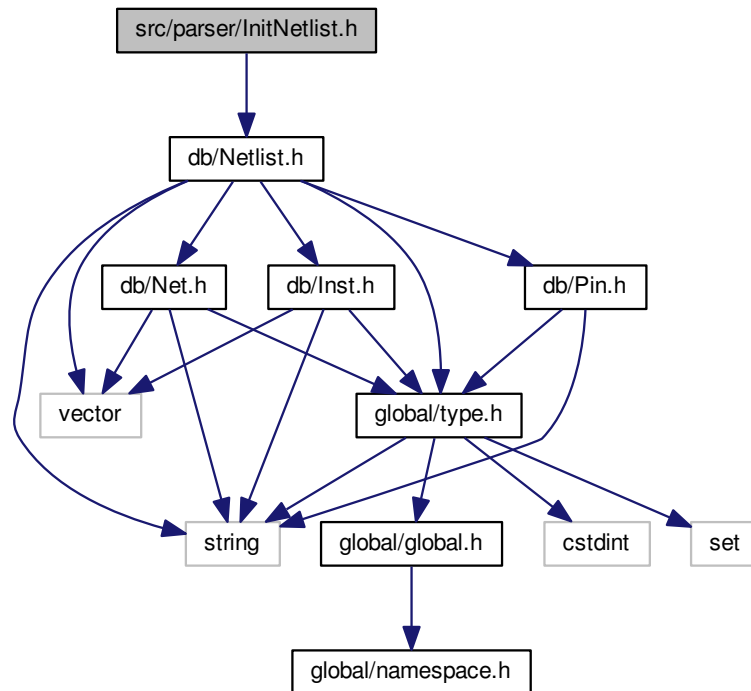
11/24/2018

4.13 src/parser/InitNetlist.h File Reference

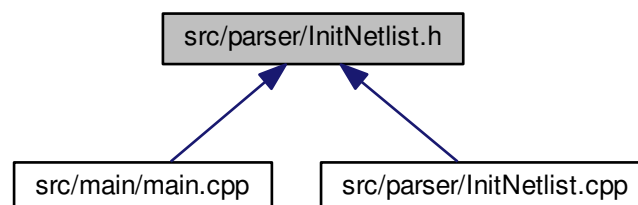
Parser to initialize netlist.

```
#include "db/Netlist.h"
```

Include dependency graph for InitNetlist.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [InitNetlist](#)
InitNetlist class.

4.13.1 Detailed Description

Parser to initialize netlist.

Author

Mingjie Liu

Date

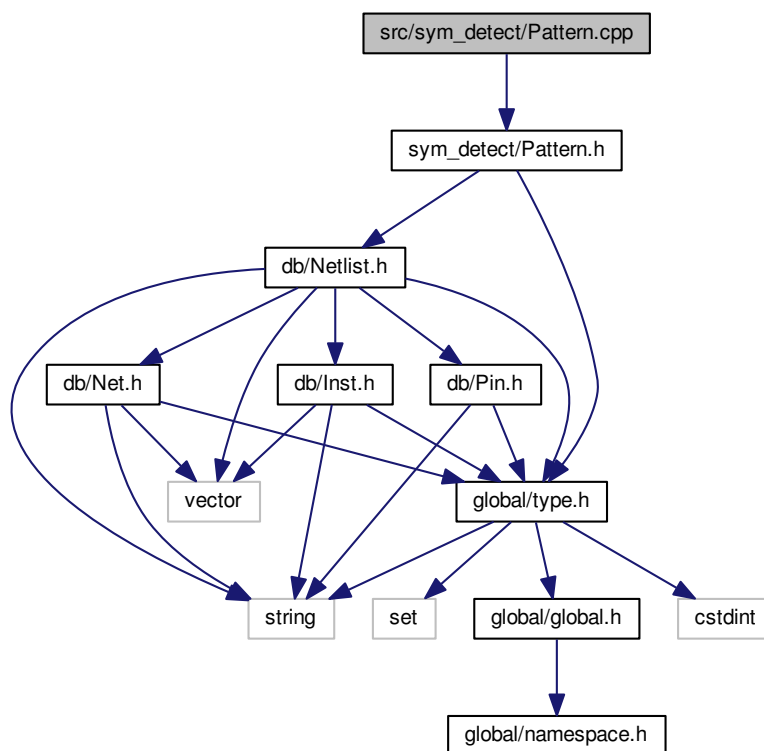
11/24/2018

Input file should follow same format generated through scripts/create_init_obj.py. The python scripts take standardized hspice/spectre netlist files as inputs. Sample input files for c++ are under benchmarks.

4.14 src/sym_detect/Pattern.cpp File Reference

[Pattern](#) definitions.

```
#include "sym_detect/Pattern.h"
Include dependency graph for Pattern.cpp:
```



4.14.1 Detailed Description

Pattern definitions.

Author

Mingjie Liu

Date

11/24/2018

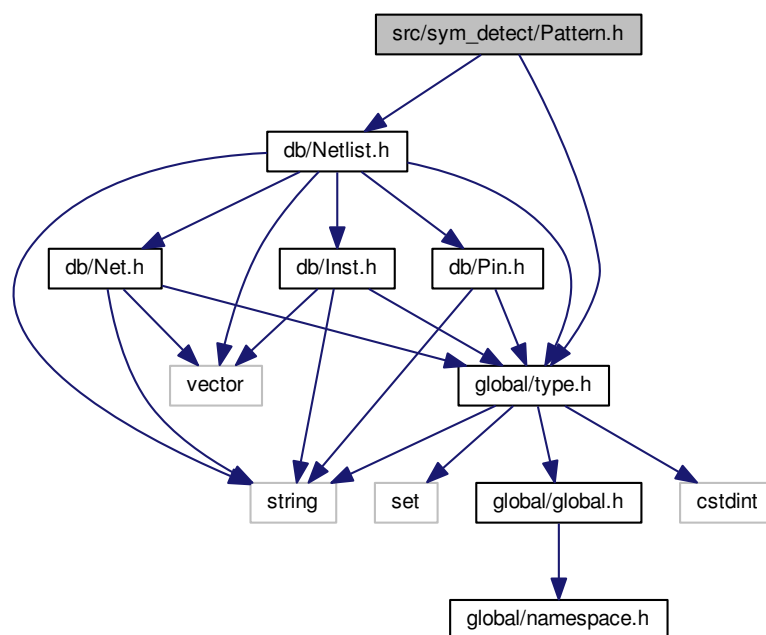
4.15 src/sym_detect/Pattern.h File Reference

Mosfet pair patterns.

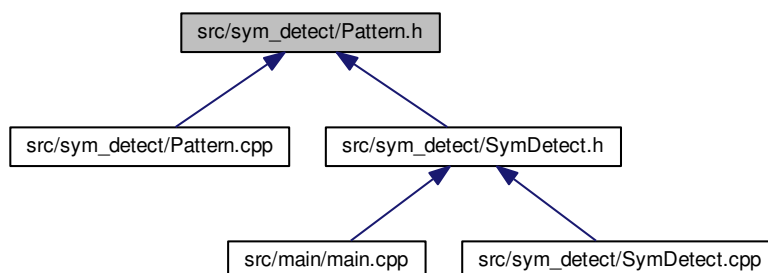
```
#include "db/Netlist.h"
```

```
#include "global/type.h"
```

Include dependency graph for Pattern.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [Pattern](#)
Pattern class.

4.15.1 Detailed Description

Mosfet pair patterns.

Author

Mingjie Liu

Date

11/24/2018

4.16 src/sym_detect/SymDetect.cpp File Reference

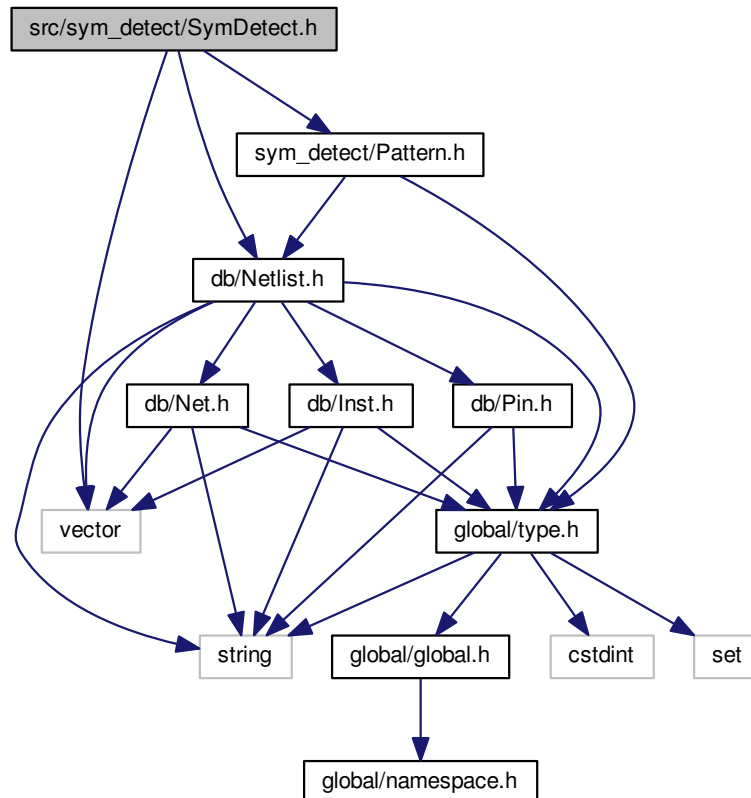
Detect symmetric patterns.

4.17 src/sym_detect/SymDetect.h File Reference

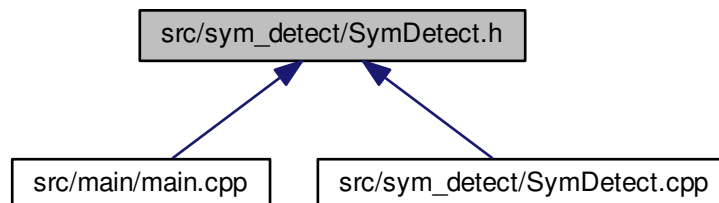
Detect symmetric patterns.

```
#include "db/Netlist.h"
#include "sym_detect/Pattern.h"
#include <vector>
```

Include dependency graph for SymDetect.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [SymDetect](#)
SymDetect class.
- struct [SymDetect::srchObj](#)
Private object to assist DFS.

4.17.1 Detailed Description

Detect symmetric patterns.

Author

Mingjie Liu

Date

11/24/2018

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