FastaPlus

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5.1.1 Detailed Description

The namespace of FastaPlus container.

5.1.2 Function Documentation

5.1.2.1 bool fastaplus::StringToBool (const string & *str*) [inline]

StringToBool function converts a numeric value to a bool

Parameters

str	[const string&]

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StringToNumeric function converts a string to a specified numeric value type

Parameters

str	[const string&]

Chapter 6

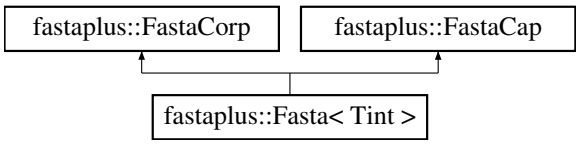
Class Documentation

6.1 fastaplus::Fasta< Tint > Class Template Reference

Class for handling fasta records.

`#include <Fasta.hpp>`

Inheritance diagram for fastaplus::Fasta< Tint >:



Public Member Functions

- Fasta ()
- Fasta (const string &File, const string &TaxId)
- Fasta (const string &File)
- ~Fasta ()
- void LoadFastaFile (const string &File)
- void LoadFastaFile (const string &File, const string &TaxId)
- void LoadFastaRec (const string &Cap, const string &Corp)
- string LoadFastaRec (const string &Cap, const string &Corp, const string &TaxId)
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- void DmpFastaAll (const string &File)
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- unordered_map< string, string > GetFastaAllExcept (const vector< string > &Caps)
- unordered_map< string, string > GetFastaOnly (const string &Cap)
- unordered_map< string, string > GetFastaOnly (const vector< string > &Caps)
- void Clear ()
- Tint GetObjSummary (const string &What)
- string GetSubStr (const string &Cap, const Tint Start, const Tint Stop)

6.1.1 Detailed Description

template<typename Tint>class fastaplus::Fasta< Tint >

Class for handling fasta records.

6.1.2 Constructor & Destructor Documentation

6.1.2.1 template<typename Tint > fastaplus::Fasta< Tint >::Fasta ( )

Fasta class constructor

6.1.2.2 template<typename Tint > fastaplus::Fasta< Tint >::Fasta (const string & *File,* const string & *TaxId*)

Fasta class constructor overload .

Constructor assumes raw header line in each record

Parameters

File	[const string&]
TaxId	[const string&]

6.1.2.3 template<typename Tint > fastaplus::Fasta< Tint >::Fasta (const string & *File*)

Fasta class constructor overload.

Constructor assumes formated header line in each record. [Ex: >si|***|ti|***|ss|***|[tab]-Add...]

Parameters

File	[const string&]

6.1.2.4 template<typename Tint > fastaplus::Fasta< Tint >::~Fasta ( )

Fasta class desctructor

6.1.3 Member Function Documentation

6.1.3.1 template<typename Tint > void fastaplus::Fasta< Tint >::Clear ( )

The function clears the containor.

Reimplemented from fastaplus::FastaCap.

6.1.3.2 template<typename Tint > void fastaplus::Fasta< Tint >::DmpFastaAll (const string & *File,* const string & *TaxId*)

Fasta record dumper.

The dumper retrieves all fasta records from the database assigned to a specified taxonomy identifier and saves them to a given file location.

Parameters

File	[const string&]
TaxId	[const string&]

6.1.3.3 template<typename Tint > void fastaplus::Fasta< Tint >::DmpFastaAll (const string & *File*)

Fasta record dumper.

The dumper retrieves all fasta records from the database and saves them to a given file location.

Parameters

File	[const string&]

6.1.3.4 template<typename Tint > void fastaplus::Fasta< Tint >::DmpFastaAllExcept (const string & *File,* const string & *Cap*)

Fasta record dumper.

The dumper retrieves all fasta records from the database except the one in Cap and

saves them to a given file location.

Parameters

File	[const string&]
Cap	[const string&]

6.1.3.5 template<typename Tint > void fastaplus::Fasta< Tint >::DmpFastaAllExcept (const string & *File,* const vector< string > & *Caps*)

Fasta record dumper.

The dumper retrieves all fasta records from the database except those in Caps and saves them to a given file location.

Parameters

File	[const string&]
Caps	[const vector<string>&]

6.1.3.6 template<typename Tint > void fastaplus::Fasta< Tint >::DmpFastaOnly (const string & *File,* const string & *Cap*)

Fasta record dumper.

The dumper retrieves only the fasta record from the database specified by Cap and saves them to a given file location.

Parameters

File	[const string&]
Cap	[const string&]

6.1.3.7 template<typename Tint > void fastaplus::Fasta< Tint >::DmpFastaOnly (const string & *File,* const vector< string > & *Caps*)

Fasta record dumper.

The dumper retrieves only those fasta record from the database specified in Caps and saves them to a given file location.

Parameters

File	[const string&]
Caps	[const vector<string>&]

6.1.3.8 template<typename Tint > unordered_map< string, string > fastaplus::Fasta< Tint >::GetCorp (const string & *TaxId*)

GetCorp retrieves all sequences assigned to a given taxonomy identifier.

Parameters

TaxId	[const string&]

6.1.3.9 template<typename Tint > unordered_map< string, string > fastaplus::Fasta< Tint >::GetFastaAll (const string & *TaxId*)

Fasta record getter.

The getter retrieves all fasta records from the database assigned to a specified taxonomy identifier and saves them to a given file location.

Parameters

TaxId	[const string&]

6.1.3.10 template<typename Tint > unordered_map< string, string > fastaplus::Fasta< Tint >::GetFastaAll ( )

Fasta record getter.

The getter retrieves all fasta records from the database and saves them to a given file location.

6.1.3.11 template<typename Tint > unordered_map< string, string > fastaplus::Fasta< Tint >::GetFastaAllExcept (const string & *Cap*)

Fasta record getter.

The getter retrieves all fasta records from the database except the one in Cap and saves them to a given file location.

Parameters

Cap	[const string&]

6.1.3.12 template<typename Tint > unordered_map< string, string > fastaplus::Fasta< Tint >::GetFastaAllExcept (const vector< string > & *Caps*)

Fasta record getter.

The getter retrieves all fasta records from the database except those in Caps and saves them to a given file location.

Parameters

Caps	[const vector<string>&]

6.1.3.13 template<typename Tint > unordered_map< string, string > fastaplus::Fasta< Tint >::GetFastaOnly (const string & *Cap*)

Fasta record getter.

The getter retrieves only the fasta record from the database specified by Cap and saves them to a given file location.

Parameters

Cap	[const string&]

6.1.3.14 template<typename Tint > unordered_map< string, string > fastaplus::Fasta< Tint >::GetFastaOnly (const vector< string > & *Caps*)

Fasta record getter.

The getter retrieves only those fasta record from the database specified in Caps and saves them to a given file location.

Parameters

Caps	[const vector<string>&]

6.1.3.15 template<typename Tint > Tint fastaplus::Fasta< Tint >::GetObjSummary (const string & *What*)

Object data getter.

Getter retrieves summary information of the object.

Parameters

What	[const string&]

6.1.3.16 template<typename Tint > string fastaplus::Fasta< Tint >::GetSubStr (const string & *Cap*, const Tint *Start*, const Tint *Stop*)

Fasta record getter.

Getter retrieves a particular substring segment from a given fasta string.

Parameters

Cap	[const string&]
Start	[const Tint]
Stop	[const Tint]

6.1.3.17 template<typename Tint > void fastaplus::Fasta< Tint >::LoadFastaFile (const string & *File*)

Fasta file loader.

The loader assumes formatted fasta header: [Ex: >si|***|ti|***|ss|***|[tab]Add...]

Parameters

File	[const string&]

6.1.3.18 template<typename Tint > void fastaplus::Fasta< Tint >::LoadFastaFile (const string & *File,* const string & *TaxId*)

Fasta file loader.

The loader assumes raw fasta header.

Parameters

File	[const string&]
TaxId	[const string&]

6.1.3.19 template<typename Tint > void fastaplus::Fasta< Tint >::LoadFastaRec (const string & *Cap,* const string & *Corp*)

Fasta record loader.

The loader assumes formatted fasta header: [Ex: >si|***|ti|***|ss|***|[tab]Add...]

Parameters

Cap	[const string&]
Corp	[const string&]

6.1.3.20 template<typename Tint > string fastaplus::Fasta< Tint >::LoadFastaRec (const string & *Cap,* const string & *Corp,* const string & *TaxId*)

Fasta record loader.

The loader assumes raw fasta header with only 3 parameters specified.

Parameters

Cap	[const string&]
Corp	[const string&]
TaxId	[const string&]

6.1.3.21 template<typename Tint > string fastaplus::Fasta< Tint >::LoadFastaRec (const string & *Cap,* const string & *Corp,* const string & *TaxId,* const string & *Ss*)

Fasta record loader.

The loader assumes raw fasta header with all 4 parameters specified.

Parameters

Cap	[const string&]
Corp	[const string&]
TaxId	[const string&]
Ss	[const string&]

6.1.3.22 template<typename Tint > void fastaplus::Fasta< Tint >::LoadFastaRec (unordered_map< string, string > & *Records*)

Fasta record loader.

The loader allows loading from a map with the assumption that fasta headers are formatted: [Ex: >si|***|ti|***|ss|***|[tab]Add...]

Parameters

Records	[unordered_map<string, string>&]

6.1.3.23 template<typename Tint > vector< string > fastaplus::Fasta< Tint >::LoadFastaRec (unordered_map< string, string > & *Records,* const string & *TaxId*)

Fasta record loader.

The loader allows loading from a map with the assumption that fasta headers are not indexed.

Parameters

Records	[unordered_map<string, string>&]
TaxId	[const string&]

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

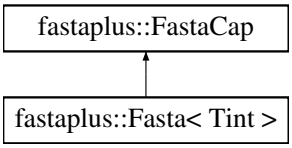
- src/include/Fasta/Fasta.hpp

6.2 fastaplus::FastaCap Class Reference

FastaCap class handles the information located in the header line of a fasta record.

`#include <FastaCap.hpp>`

Inheritance diagram for fastaplus::FastaCap:



Public Member Functions

- FastaCap (vector< string > &Caps)
- FastaCap (const string &Cap)
- ~FastaCap ()
- void LoadCap (const string &Cap)
- void LoadCap (vector< string > &Caps)
- vector< string > & GetCapSiForTi (const string &Ti)
- vector< vector< string > > GetCapSiForTi (vector< string > &Tis)
- string & GetCapSiForSs (const string &Ss)
- vector< string > GetCapSiForSs (vector< string > &Sss)
- string GetCapSiForCap (const string &Cap)
- vector< string > GetCapSiForCap (vector< string > &Caps)
- string & GetCapTiForSi (const string &Si)
- vector< string > GetCapTiForSi (vector< string > &Sis)
- string & GetCapSsForSi (const string &Si)
- vector< string > GetCapSsForSi (vector< string > &Sis)
- string & GetCapMetaForSi (const string &Si)
- vector< string > GetCapMetaForSi (vector< string > &Sis)
- vector< string > GetCapAll ()
- void Clear ()

6.2.1 Detailed Description

FastaCap class handles the information located in the header line of a fasta record.

6.2.2 Constructor & Destructor Documentation

6.2.2.1 fastaplus::FastaCap::FastaCap (vector< string > & *Caps*)

FastaCap class constructor for adding multiple fasta records. By default constructor assumes >si|***|ti|***|ss|***|[tab]Add... format.

Parameters

Caps	[vector<string>&]

Example:

```
vector<string> Caps ={">si|***|ti|***|ss|***|[tab]Add...","
     >si|***|ti|***|ss|***|[tab]Add...",">si|***|ti|***|ss|***|[tab]Add..."}
FastaCap fastaCap(Caps);
```

6.2.2.2 fastaplus::FastaCap::FastaCap (const string & *Cap*)

FastaCap class constructor for adding single fasta record. By default constructor assumes >si|***|ti|***|ss|***|[tab]Add... format.

Parameters

Cap	[const string&]

Example:

```
FastaCap fastaCap(">si|***|ti|***|ss|***|[tab]Add...");
```

6.2.2.3 fastaplus::FastaCap::~FastaCap ( )

FastaCap class destructor

6.2.3 Member Function Documentation

6.2.3.1 void fastaplus::FastaCap::Clear ( )

The function eraces the containor.

Reimplemented in fastaplus::Fasta< Tint >.

6.2.3.2 vector< string > fastaplus::FastaCap::GetCapAll ( )

GetCapAll function returns all header identifiers.

6.2.3.3 string & fastaplus::FastaCap::GetCapMetaForSi (const string & *Si*)

GetCapMetaForSi function returns associated meta information for a given si identifier.

Parameters

Si	[string&]

6.2.3.4 vector< string > fastaplus::FastaCap::GetCapMetaForSi (vector< string > & *Sis*)

GetCapMetaForSi function returns a set of associated meta information for a given set of si identifiers.

Parameters

Sis	[vector<string>&]

6.2.3.5 string fastaplus::FastaCap::GetCapSiForCap (const string & *Cap*)

GetCapSiForCap function extracts ss identifier from a given fasta indexed header.

Parameters

Cap	[const string&]

Example:

```
string si= GetCapSiForCap(">si|12345|ti|***|ss|***|\tAdd...");
cout << si << endl;// prints: 12345
```

6.2.3.6 vector< string > fastaplus::FastaCap::GetCapSiForCap (vector< string > & *Caps*)

GetCapSiForCap function extracts ss identifier from a given fasta indexed header.

Parameters

Caps	[vector<string>&]

Example:

```
vector<string> vec = {">si|12345|ti|***|ss|***|[tab]Add...","
     >si|67890|ti|***|ss|***|[tab]Add..."}
vector<string> si= GetCapSiForCap(vec);
// si contains: 12345, 67890
```

6.2.3.7 string & fastaplus::FastaCap::GetCapSiForSs (const string & *Ss*)

GetCapSiForSs function returns all si identifiers for a given ti.

Parameters

Ss	[const string&]

Example:

```
vector<string> ss = GetCapSiForTi("12345");
```

6.2.3.8 vector< string > fastaplus::FastaCap::GetCapSiForSs (vector< string > & *Sss*)

GetCapSiForSs function overload returns all si identifiers for a given ss ones.

Parameters

Sss	[const string&]

Example:

```
vector<string> sss = {"12345", "67890"}
vector<vector <string>> vec = GetCapSiForTi(sss);
```

6.2.3.9 vector< string > & fastaplus::FastaCap::GetCapSiForTi (const string & *Ti*)

GetCapSiForTi function returns all si identifiers for a given ti.

Parameters

Ti	[const string&]

Example:

```
vector<string> vec = GetCapSiForTi("12345");
```

6.2.3.10 vector< vector< string > > fastaplus::FastaCap::GetCapSiForTi (vector< string > & *Tis*)

GetCapSiForTi function overload returns all si identifiers for a given ti ones.

Parameters

Tis	[vector<string>&]

Example:

```
vector<string> tiss = {"12345", "67890"}
vector<vector <string>> vec = GetCapSiForTi(tis);
```

6.2.3.11 string & fastaplus::FastaCap::GetCapSsForSi (const string & *Si*)

GetCapSsForSi function returns si identifier for a given si identifier.

Parameters

Si	[string&]

6.2.3.12 vector< string > fastaplus::FastaCap::GetCapSsForSi (vector< string > & *Sis*)

GetCapSsForSi function returns a set of ss identifiers for a given si identifier.

Parameters

Sis	[vector<string>&]

6.2.3.13 string & fastaplus::FastaCap::GetCapTiForSi (const string & *Si*)

GetCapTiForSi function returns ti identifier for a given si identifier.

Parameters

Si	[string&]

6.2.3.14 vector< string > fastaplus::FastaCap::GetCapTiForSi (vector< string > & *Sis*)

GetCapTiForSi function returns a set of ti identifiers for a given si identifier.

Parameters

Sis	[vector<string>&]

6.2.3.15 void fastaplus::FastaCap::LoadCap (const string & *Cap*)

LoadCap function for adding single fasta record. By default constructor assumes >si|***|ti|***|ss|***|[tab]Add... format.

Parameters

Cap	[const string&]

Example:

```
LoadCap(">si|***|ti|***|ss|***|[tab]Add...");
```

6.2.3.16 void fastaplus::FastaCap::LoadCap (vector< string > & *Caps*)

LoadCap function for adding multiple fasta records. By default constructor assumes >si|***|ti|***|ss|***|[tab]Add... format.

Parameters

Caps	[vector<string>&]

Example:

```
vector<string> Caps ={">si|***|ti|***|ss|***|[tab]Add...","
     >si|***|ti|***|ss|***|[tab]Add...",">si|***|ti|***|ss|***|[tab]Add..."}
FastaCap fastaCap(Caps);
```

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

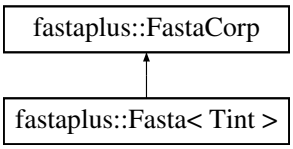
- src/include/Fasta/FastaCap.hpp

6.3 fastaplus::FastaCorp Class Reference

FastaCorp class processes the sequence of a given Fasta record.

`#include <FastaCorp.hpp>`

Inheritance diagram for fastaplus::FastaCorp:



Public Member Functions

- FastaCorp (unordered_map< string, string > &Corp)
- FastaCorp (const string &Id, const string &Corp)
- ~FastaCorp ()
- void LoadCleanCorp (unordered_map< string, string > &Corp)
- void LoadCleanCorp (const string &Id, const string &Corp)

- void LoadCorp (unordered_map< string, string > &Corp)
- void LoadCorp (const string &Id, const string &Corp)
- unordered_map< string, string > GetCorpOnly (const string &Id)
- unordered_map< string, string > GetCorpOnly (vector< string > &Ids)
- unordered_map< string, string > GetCorpAllExcept (const string &Id)
- unordered_map< string, string > GetCorpAllExcept (vector< string > &Ids)
- unordered_map< string, string > GetCorpAll ()
- void Clear ()

6.3.1 Detailed Description

FastaCorp class processes the sequence of a given Fasta record.

6.3.2 Constructor & Destructor Documentation

6.3.2.1 fastaplus::FastaCorp::FastaCorp (unordered_map< string, string > & *Corp*)

FastaCorp class constructor for adding multiple fasta records. By default constructor assumes strings are not clean.

Parameters

Corp	[unordered_map<string,string>&]

Example:

```
FastaCorp fastaCorp(map);
  // where map is a construct of a string identifier and its content
  //  id => ATVYYWQEGGGESS...
```

6.3.2.2 fastaplus::FastaCorp::FastaCorp (const string & *Id,* const string & *Corp*)

FastaCorp class constructor overload for adding a single fasta record. By default constructor assumes the string is not clean.

Parameters

Id	[const string&]
Corp	[const string&]

Example:

```
FastaCorp fastaCorp("ID", "ATVYYWQEGGGESS...");
```

6.3.2.3 fastaplus::FastaCorp::~FastaCorp ( )

FastaCorp class destructor.

6.3.3 Member Function Documentation

6.3.3.1 void fastaplus::FastaCorp::Clear ( )

The function clears the containor.

Reimplemented in fastaplus::Fasta< Tint >.

6.3.3.2 unordered_map< string, string > fastaplus::FastaCorp::GetCorpAll ( )

GetCorpAllExcept function returns all strings within a containor

6.3.3.3 unordered_map< string, string > fastaplus::FastaCorp::GetCorpAllExcept (const string & *Id*)

GetCorpAllExcept function returns all strings except the one scpecified

Parameters

Id	[const string&]

6.3.3.4 unordered_map< string, string > fastaplus::FastaCorp::GetCorpAllExcept (vector< string > & *Ids*)

GetCorpAllExcept function overload returns all strings except the ones within a given vector

Parameters

Ids	[vector<string>&]

6.3.3.5 unordered_map< string, string > fastaplus::FastaCorp::GetCorpOnly (const string & *Id*)

GetCorpOnly function returns a specific string

Parameters

Id	[const string&]

6.3.3.6 unordered_map< string, string > fastaplus::FastaCorp::GetCorpOnly (vector< string > & *Ids*)

GetCorpOnly function overload returns a set of specified strings

Parameters

Ids	[vector<string>&]

6.3.3.7 void fastaplus::FastaCorp::LoadCleanCorp (unordered_map< string, string > & *Corp*)

LoadClean function loads strings into a container as they are

Parameters

Corp	[unordered_map<string,string>&]

6.3.3.8 void fastaplus::FastaCorp::LoadCleanCorp (const string & *Id*, const string & *Corp*)

LoadClean function overload loads a single string into a container as is

Parameters

Id	[const string&]
Corp	[const string&]

6.3.3.9 void fastaplus::FastaCorp::LoadCorp (unordered_map< string, string > & *Corp*)

Load function cleans strings before loading them into a container

Parameters

Corp	[unordered_map<string,string>&]

6.3.3.10 void fastaplus::FastaCorp::LoadCorp (const string & *Id*, const string & *Corp*)

Load function overload cleans a string before loading it into a container

Parameters

Id	[const string&]
Corp	[const string&]

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

- src/include/Fasta/FastaCorp.hpp

6.4 fastaplus::SEG< Tint > Class Template Reference

SEG AA sequence filter.

`#include <SEG.hpp>`

Classes

- struct **AIphabet**
- struct **CSeq**
- struct **SeqSeg**

Public Member Functions

- template<typename Targ >
  SEG (Targ &arg)
- SEG ()
- ~SEG ()
- string Filter (string str)

6.4.1 Detailed Description

template<typename Tint>class fastaplus::SEG< Tint >

SEG AA sequence filter.

6.4.2 Constructor & Destructor Documentation

6.4.2.1 template<typename Tint > template<typename Targ > fastaplus::SEG< Tint >::SEG (Targ & *arg*)

SEG class constructor.

Parameters

arg	[unordered_map<string,string>&]

6.4.2.2 template<typename Tint > fastaplus::SEG< Tint >::SEG ( )

SEG class default constructor.

6.4.2.3 template<typename Tint > fastaplus::SEG< Tint >::~SEG ( )

SEG class destructor.

6.4.3 Member Function Documentation

6.4.3.1 template<typename Tint > string fastaplus::SEG< Tint >::Filter (string *str*)

Filter function identifies and masks (xXx) low complexity segments.

Parameters

str	[string] // AA sequence

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

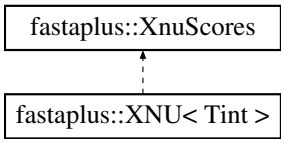
- src/include/Filters/SEG.hpp

6.5 fastaplus::XNU< Tint > Class Template Reference

XNU filter class.

`#include <XNU.hpp>`

Inheritance diagram for fastaplus::XNU< Tint >:



Public Member Functions

- XNU ()
- XNU (unordered_map< string, string > &Param)
- ~XNU ()
- string Filter (const string &str)

6.5.1 Detailed Description

template<typename Tint>class fastaplus::XNU< Tint >

XNU filter class.

6.5.2 Constructor & Destructor Documentation

6.5.2.1 template<typename Tint > fastaplus::XNU< Tint >::XNU ( )

Default constructor

6.5.2.2 template<typename Tint > fastaplus::XNU< Tint >::XNU (unordered_map< string, string > & *Param*)

Constructor overload

Parameters

Param	[unordered_map<string,string>&]

6.5.2.3 template<typename Tint > fastaplus::XNU< Tint >::~XNU ( )

Destructor

6.5.3 Member Function Documentation

6.5.3.1 template<typename Tint > string fastaplus::XNU< Tint >::Filter (const string & *str*)

Function executing filtering procedure

Parameters

str	[const string&]

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

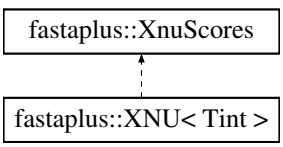
- src/include/Filters/XNU.hpp

6.6 fastaplus::XnuScores Class Reference

XnuScores class containing default matrices and parameters.

`#include <XNUData.hpp>`

Inheritance diagram for fastaplus::XnuScores:



Public Member Functions

- XnuScores ()
- ~XnuScores ()

Protected Attributes

- double Lambda60
- double Lambda120
- double Lambda250
- vector< int > M
- vector< vector< int > > Pam60
- vector< vector< int > > Pam120
- vector< vector< int > > Pam250
- string Alphabet
- vector< double > Dayhoff
- vector< double > Blast

6.6.1 Detailed Description

XnuScores class containing default matrices and parameters.

6.6.2 Constructor & Destructor Documentation

6.6.2.1 fastaplus::XnuScores::XnuScores ( ) [inline]

XnuScores constructor

6.6.2.2 fastaplus::XnuScores::~XnuScores ( ) [inline]

XnuScores destructor

6.6.3 Member Data Documentation

6.6.3.1 string fastaplus::XnuScores::Alphabet [protected]

The protein Alphabet

Alphabet ="ARNDCQEGHILKMFPSTWYVBZX*-";

6.6.3.2 vector<double> fastaplus::XnuScores::Blast [protected]

Blast = { 0.081, 0.057, 0.045, 0.054, 0.015, 0.039, 0.061, 0.068, 0.022, 0.057, 0.093, 0.056, 0.025, 0.040, 0.049, 0.068, 0.058, 0.013, 0.032, 0.067 };

6.6.3.3 vector<double> fastaplus::XnuScores::Dayhoff [protected]

Dayhoff = {0.087, 0.041, 0.040, 0.047, 0.033, 0.038, 0.050, 0.088, 0.034, 0.037, 0.085, 0.081, 0.015, 0.040, 0.051, 0.070, 0.058, 0.010,

6.6.3.4 double fastaplus::XnuScores::Lambda120 [protected]

Lambda for PAM120 matrix

Lambda120 = 0.346574

6.6.3.5 double fastaplus::XnuScores::Lambda250 [protected]

Lambda for PAM250 matrix

Lambda250 = 0.231049

6.6.3.6 double fastaplus::XnuScores::Lambda60 [protected]

Lambda for PAM60 matrix

Lambda60 = 0.346574

6.6.3.7 vector<int> fastaplus::XnuScores::M [protected]

Mdm matrix

```
M     = { 9867,  2,  9, 10,  3,  8, 17, 21,  2,  6,  4,  2,  6,  2, 22, 35
 , 32, 0,  2, 18,
            1, 9913,  1,  0,  1, 10,  0,  0, 10,  3,  1, 19,  4,  1,  4,
  6,  1, 8,  0,  1,
            4,  1, 9822, 36,  0,  4,  6,  6, 21,  3,  1, 13,  0,  1,  2,
 20,  9, 1,  4,  1,
            6,  0, 42, 9859,  0,  6, 53,  6,  4,  1,  0,  3,  0,  0,  1,
  5,  3, 0,  0,  1,
            1,  1,  0,  0, 9973,  0,  0,  0,  1,  1,  0,  0,  0,  0,  1,
  5,  1, 0,  3,  2,
            3,  9,  4,  5,  0, 9876, 27,  1, 23,  1,  3,  6,  4,  0,  6,
  2,  2, 0,  0,  1,
           10,  0,  7, 56,  0, 35, 9865,  4,  2,  3,  1,  4,  1,  0,  3,
  4,  2, 0,  1,  2,
           21,  1, 12, 11,  1,  3,  7, 9935,  1,  0,  1,  2,  1,  1,  3,
```

```
21,  3, 0,  0,  5,
            1,  8, 18,  3,  1, 20,  1,  0, 9912,  0,  1,  1,  0,  2,  3,
 1,  1, 1,  4,  1,
            2,  2,  3,  1,  2,  1,  2,  0,  0, 9872,  9,  2, 12,  7,  0,
 1,  7, 0,  1, 33,
            3,  1,  3,  0,  0,  6,  1,  1,  4, 22, 9947,  2, 45, 13,  3,
 1,  3, 4,  2, 15,
            2, 37, 25,  6,  0, 12,  7,  2,  2,  4,  1, 9926, 20,  0,  3,
 8, 11, 0,  1,  1,
            1,  1,  0,  0,  0,  2,  0,  0,  0,  5,  8,  4, 9874,  1,  0,
 1,  2, 0,  0,  4,
            1,  1,  1,  0,  0,  0,  0,  1,  2,  8,  6,  0,  4, 9946,  0,
 2,  1, 3, 28,  0,
           13,  5,  2,  1,  1,  8,  3,  2,  5,  1,  2,  2,  1,  1, 9926,
12,  4, 0,  0,  2,
          28, 11, 34,  7, 11,  4,  6, 16,  2,  2,  1,  7,  4,  3, 17,
9840, 38, 5,  2,  2,
           22,  2, 13,  4,  1,  3,  2,  2,  1, 11,  2,  8,  6,  1,  5, 32
, 9871, 0,  2,  9,
            0,  2,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  1,  0,  1
,  0, 9976, 1,  0,
            1,  0,  3,  0,  3,  0,  1,  0,  4,  1,  1,  0,  0, 21,  0,  1
,  1, 2, 9945,  1,
           13,  2,  1,  1,  3,  2,  2,  3,  3, 57, 11,  1, 17,  1,  3,  2
, 10, 0, 2, 9901};
```

6.6.3.8 vector<vector<int> > fastaplus::XnuScores::Pam120 [protected]

This matrix was produced by "pam" Version 1.0.2, [18-Sep-91]

PAM 120, substitution matrix, scale = ln(2)/2, = 0.346574

Lowest score = -8, Highest score = 12

```
  Pam120 = {{ 3, -3, -1,  0, -3, -1,  0,  1, -3, -1, -3, -2, -2, -4,  1,
 1,  1, -7, -4,  0,  1,  0,  0, -8, -999999},
            {-3,  6, -1, -3, -4,  1, -3, -4,  1, -2, -4,  2, -1, -5, -1,
-1, -2,  1, -5, -3, -1,  0,  0, -8, -999999},
            {-1, -1,  4,  2, -5,  0,  1,  0,  2, -2, -4,  1, -3, -4, -2,
 1,  0, -4, -2, -3,  4,  1,  0, -8, -999999},
            { 0, -3,  2,  5, -7,  1,  3,  0,  0, -3, -5, -1, -4, -7, -3,
 0, -1, -8, -5, -3,  5,  3,  0, -8, -999999},
            {-3, -4, -5, -7,  9, -7, -7, -4, -4, -3, -7, -7, -6, -6, -4,
 0, -3, -8, -1, -3, -4, -6,  0, -8, -999999},
            {-1,  1,  0,  1, -7,  6,  2, -3,  3, -3, -2,  0, -1, -6,  0,
-2, -2, -6, -5, -3,  1,  5,  0, -8, -999999},
            { 0, -3,  1,  3, -7,  2,  5, -1, -1, -3, -4, -1, -3, -7, -2,
-1, -2, -8, -5, -3,  3,  5,  0, -8, -999999},
            { 1, -4,  0,  0, -4, -3, -1,  5, -4, -4, -5, -3, -4, -5, -2,
 1, -1, -8, -6, -2,  1, -1,  0, -8, -999999},
            {-3,  1,  2,  0, -4,  3, -1, -4,  7, -4, -3, -2, -4, -3, -1,
-2, -3, -3, -1, -3,  2,  2,  0, -8, -999999},
            {-1, -2, -2, -3, -3, -3, -3, -4, -4,  6,  1, -3,  1,  0, -3,
-2,  0, -6, -2,  3, -2, -2,  0, -8, -999999},
            {-3, -4, -4, -5, -7, -2, -4, -5, -3,  1,  5, -4,  3,  0, -3,
-4, -3, -3, -2,  1, -3, -2,  0, -8, -999999},
            {-2,  2,  1, -1, -7,  0, -1, -3, -2, -3, -4,  5,  0, -7, -2,
-1, -1, -5, -5, -4,  1,  0,  0, -8, -999999},
            {-2, -1, -3, -4, -6, -1, -3, -4, -4,  1,  3,  0,  8, -1, -3,
-2, -1, -6, -4,  1, -3, -1,  0, -8, -999999},
```

```
            {-4, -5, -4, -7, -6, -6, -7, -5, -3,  0,  0, -7, -1,  8, -5,
 -3, -4, -1,  4, -3, -4, -5,  0, -8, -999999},
            { 1, -1, -2, -3, -4,  0, -2, -2, -1, -3, -3, -2, -3, -5,  6,
  1, -1, -7, -6, -2, -1,  0,  0, -8, -999999},
            { 1, -1,  1,  0,  0, -2, -1,  1, -2, -2, -4, -1, -2, -3,  1,
  3,  2, -2, -3, -2,  1,  0,  0, -8, -999999},
            { 1, -2,  0, -1, -3, -2, -2, -1, -3,  0, -3, -1, -1, -4, -1,
  2,  4, -6, -3,  0,  1, -1,  0, -8, -999999},
            {-7,  1, -4, -8, -8, -6, -8, -8, -3, -6, -3, -5, -6, -1, -7,
 -2, -6, 12, -2, -8, -5, -6,  0, -8, -999999},
            {-4, -5, -2, -5, -1, -5, -5, -6, -1, -2, -2, -5, -4,  4, -6,
 -3, -3, -2,  8, -3, -2, -4,  0, -8, -999999},
            { 0, -3, -3, -3, -3, -3, -3, -2, -3,  3,  1, -4,  1, -3, -2,
 -2,  0, -8, -3,  5, -2, -2,  0, -8, -999999},
            { 1, -1,  4,  5, -4,  1,  3,  1,  2, -2, -3,  1, -3, -4, -1,
  1,  1, -5, -2, -2,  6,  4,  0, -8, -999999},
            { 0,  0,  1,  3, -6,  5,  5, -1,  2, -2, -2,  0, -1, -5,  0,
  0, -1, -6, -4, -2,  4,  6,  0, -8, -999999},
            { 0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
  0,  0,  0,  0,  0,  0,  0,  0, -8, -999999},
            {-8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8,
 -8, -8, -8, -8, -8, -8, -8, -8,  1, -999999},
            {-999999, -999999, -999999, -999999, -999999, -999999, -
999999, -999999, -999999, -999999, -999999, -999999, -999999, -999999,
             -999999, -999999, -999999, -999999, -999999, -999999, -
999999, -999999, -999999, -999999, -999999, -999999}};
```

6.6.3.9 vector<vector<int> > fastaplus::XnuScores::Pam250 [protected]

This matrix was produced by "pam" Version 1.0.2, [18-Sep-91]

PAM 250, substitution matrix, scale = ln(2)/3, = 0.231049

Lowest score = -8, Highest score = 17

```
    Pam250 = {{ 2, -2,  0,  0, -2,  0,  0,  1, -1, -1, -2, -1, -1, -3,  1
,  1,  1, -6, -3,  0,  2,  1,  0, -8, -999999},
              {-2,  6,  0, -1, -4,  1, -1, -3,  2, -2, -3,  3,  0, -4,  0
,  0, -1,  2, -4, -2,  1,  2,  0, -8, -999999},
              { 0,  0,  2,  2, -4,  1,  1,  0,  2, -2, -3,  1, -2, -3,  0
,  1,  0, -4, -2, -2,  4,  3,  0, -8, -999999},
              { 0, -1,  2,  4, -5,  2,  3,  1,  1, -2, -4,  0, -3, -6, -1
,  0,  0, -7, -4, -2,  5,  4,  0, -8, -999999},
              {-2, -4, -4, -5, 12, -5, -5, -3, -3, -2, -6, -5, -5, -4, -3
,  0, -2, -8,  0, -2, -3, -4,  0, -8, -999999},
              { 0,  1,  1,  2, -5,  4,  2, -1,  3, -2, -2,  1, -1, -5,  0
, -1, -1, -5, -4, -2,  3,  5,  0, -8, -999999},
              { 0, -1,  1,  3, -5,  2,  4,  0,  1, -2, -3,  0, -2, -5, -1
,  0,  0, -7, -4, -2,  4,  5,  0, -8, -999999},
              { 1, -3,  0,  1, -3, -1,  0,  5, -2, -3, -4, -2, -3, -5,  0
,  1,  0, -7, -5, -1,  2,  1,  0, -8, -999999},
              {-1,  2,  2,  1, -3,  3,  1, -2,  6, -2, -2,  0, -2, -2,  0
, -1, -1, -3,  0, -2,  3,  3,  0, -8, -999999},
              {-1, -2, -2, -2, -2, -2, -2, -3, -2,  5,  2, -2,  2,  1, -2
, -1,  0, -5, -1,  4, -1, -1,  0, -8, -999999},
              {-2, -3, -3, -4, -6, -2, -3, -4, -2,  2,  6, -3,  4,  2, -3
, -3, -2, -2, -1,  2, -2, -1,  0, -8, -999999},
              {-1,  3,  1,  0, -5,  1,  0, -2,  0, -2, -3,  5,  0, -5, -1
,  0,  0, -3, -4, -2,  2,  2,  0, -8, -999999},
              {-1,  0, -2, -3, -5, -1, -2, -3, -2,  2,  4,  0,  6,  0, -2
```

```
, -2, -1, -4, -2,  2, -1,  0,  0, -8, -999999},
              {-3, -4, -3, -6, -4, -5, -5, -5, -2,  1,  2, -5,  0,  9, -5
, -3, -3,  0,  7, -1, -3, -4,  0, -8, -999999},
              { 1,  0,  0, -1, -3,  0, -1,  0,  0, -2, -3, -1, -2, -5,  6
,  1,  0, -6, -5, -1,  1,  1,  0, -8, -999999},
              { 1,  0,  1,  0,  0, -1,  0,  1, -1, -1, -3,  0, -2, -3,  1
,  2,  1, -2, -3, -1,  2,  1,  0, -8, -999999},
              { 1, -1,  0,  0, -2, -1,  0,  0, -1,  0, -2,  0, -1, -3,  0
,  1,  3, -5, -3,  0,  2,  1,  0, -8, -999999},
              {-6,  2, -4, -7, -8, -5, -7, -7, -3, -5, -2, -3, -4,  0, -6
, -2, -5, 17,  0, -6, -4, -4,  0, -8, -999999},
              {-3, -4, -2, -4,  0, -4, -4, -5,  0, -1, -1, -4, -2,  7, -5
, -3, -3,  0, 10, -2, -2, -3,  0, -8, -999999},
              { 0, -2, -2, -2, -2, -2, -2, -1, -2,  4,  2, -2,  2, -1, -1
, -1,  0, -6, -2,  4,  0,  0,  0, -8, -999999},
              { 2,  1,  4,  5, -3,  3,  4,  2,  3, -1, -2,  2, -1, -3,  1
,  2,  2, -4, -2,  0,  6,  5,  0, -8, -999999},
              { 1,  2,  3,  4, -4,  5,  5,  1,  3, -1, -1,  2,  0, -4,  1
,  1,  1, -4, -3,  0,  5,  6,  0, -8, -999999},
              { 0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0
,  0,  0,  0,  0,  0,  0,  0,  0, -8, -999999},
              {-8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8, -8
, -8, -8, -8, -8, -8, -8, -8, -8,  1, -999999},
              {-999999, -999999, -999999, -999999, -999999, -999999, -
999999, -999999, -999999, -999999, -999999, -999999, -999999,
               -999999, -999999, -999999, -999999, -999999, -999999, -
999999, -999999, -999999, -999999, -999999, -999999 }};
```

6.6.3.10 vector<vector<int> > fastaplus::XnuScores::Pam60 [protected]

This matrix was produced by "pam" Version 1.0.2 [18-Sep-91]

PAM 60 substitution matrix, scale = ln(2)/2 = 0.346574

Lowest score = -12, Highest score = 13

```
  Pam60 = {{  5,  -5,  -2,  -2,  -5,  -3,  -1,   0,  -5,  -3,  -4,  -5,
-3,  -6,   0,   1,   1, -10,  -6,  -1,  -1,  -1,   0, -12, -999999},
           { -5,   8,  -3,  -6,  -6,   0,  -6,  -7,   0,  -4,  -6,   2,
-2,  -7,  -2,  -2,  -4,   0,  -8,  -5,  -3,  -1,   0, -12, -999999},
           { -2,  -3,   6,   2,  -7,  -2,   0,  -1,   1,  -4,  -5,   0,
-6,  -6,  -4,   1,  -1,  -6,  -3,  -5,   6,   0,   0, -12, -999999},
           { -2,  -6,   2,   7, -10,  -1,   3,  -2,  -2,  -5,  -9,  -2,
-7, -11,  -5,  -2,  -3, -11,  -8,  -6,   6,   3,   0, -12, -999999},
           { -5,  -6,  -7, -10,   9, -10, -10,  -7,  -6,  -4, -11, -10, -
10,  -9,  -6,  -1,  -5, -12,  -2,  -4,  -8,  -9,   0, -12, -999999},
           { -3,   0,  -2,  -1, -10,   7,   2,  -5,   2,  -5,  -3,  -1,
-2,  -9,  -1,  -3,  -4,  -9,  -8,  -5,   0,   7,   0, -12, -999999},
           { -1,  -6,   0,   3, -10,   2,   7,  -2,  -3,  -4,  -7,  -3,
-5, -10,  -3,  -2,  -4, -12,  -7,  -4,   3,   6,   0, -12, -999999},
           {  0,  -7,  -1,  -2,  -7,  -5,  -2,   6,  -6,  -7,  -8,  -5,
-6,  -7,  -4,   0,  -3, -11, -10,  -4,  -1,  -2,   0, -12, -999999},
           { -5,   0,   1,  -2,  -6,   2,  -3,  -6,   8,  -6,  -4,  -4,
-7,  -4,  -2,  -4,  -5,  -5,  -2,  -5,   1,   1,   0, -12, -999999},
           { -3,  -4,  -4,  -5,  -4,  -5,  -4,  -7,  -6,   7,   0,  -4,
 1,  -1,  -6,  -4,  -1, -10,  -4,   3,  -3,  -4,   0, -12, -999999},
           { -4,  -6,  -5,  -9, -11,  -3,  -7,  -8,  -4,   0,   6,  -6,
 2,  -1,  -5,  -6,  -5,  -4,  -5,  -1,  -6,  -4,   0, -12, -999999},
           { -5,   2,   0,  -2, -10,  -1,  -3,  -5,  -4,  -4,  -6,   6,
 0, -10,  -4,  -2,  -2,  -8,  -7,  -6,   0,  -1,   0, -12, -999999},
```

```
            { -3,  -2,  -6,  -7, -10,  -2,  -5,  -6,  -7,   1,   2,   0,
10,  -2,  -6,  -4,  -2,  -9,  -7,   0,  -5,  -2,   0, -12, -999999},
            { -6,  -7,  -6, -11,  -9,  -9, -10,  -7,  -4,  -1,  -1, -10,
-2,   8,  -7,  -5,  -6,  -3,   3,  -5,  -7,  -9,   0, -12, -999999},
            {  0,  -2,  -4,  -5,  -6,  -1,  -3,  -4,  -2,  -6,  -5,  -4,
-6,  -7,   7,   0,  -2, -10, -10,  -4,  -3,  -1,   0, -12, -999999},
            {  1,  -2,   1,  -2,  -1,  -3,  -2,   0,  -4,  -4,  -6,  -2,
-4,  -5,   0,   5,   1,  -4,  -5,  -4,   1,  -2,   0, -12, -999999},
            {  1,  -4,  -1,  -3,  -5,  -4,  -4,  -3,  -5,  -1,  -5,  -2,
-2,  -6,  -2,   1,   6,  -9,  -5,  -1,   0,  -3,   0, -12, -999999},
            {-10,   0,  -6, -11, -12,  -9, -12, -11,  -5, -10,  -4,  -8,
-9,  -3, -10,  -4,  -9,  13,  -3, -11,  -7,  -9,   0, -12, -999999},
            { -6,  -8,  -3,  -8,  -2,  -8,  -7, -10,  -2,  -4,  -5,  -7,
-7,   3, -10,  -5,  -5,  -3,   9,  -5,  -4,  -6,   0, -12, -999999},
            { -1,  -5,  -5,  -6,  -4,  -5,  -4,  -4,  -5,   3,  -1,  -6,
 0,  -5,  -4,  -4,  -1, -11,  -5,   6,  -4,  -4,   0, -12, -999999},
            { -1,  -3,   6,   6,  -8,   0,   3,  -1,   1,  -3,  -6,   0,
-5,  -7,  -3,   1,   0,  -7,  -4,  -4,   7,   3,   0, -12, -999999},
            { -1,  -1,   0,   3,  -9,   7,   6,  -2,   1,  -4,  -4,  -1,
-2,  -9,  -1,  -2,  -3,  -9,  -6,  -4,   3,   7,   0, -12, -999999},
            {  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
 0,   0,   0,   0,   0,   0,   0,   0,   0,   0, -12, -999999},
            {-12, -12, -12, -12, -12, -12, -12, -12, -12, -12, -12, -12, -
12, -12, -12, -12, -12, -12, -12, -12, -12, -12,   1, -999999},
            {-999999, -999999, -999999, -999999, -999999, -999999, -999999
, -999999, -999999, -999999, -999999, -999999, -999999,
            -999999, -999999, -999999, -999999, -999999, -999999, -999999,
 -999999, -999999, -999999, -999999, -999999 }};
```

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

- src/include/Filters/XNUData.hpp

Chapter 7

File Documentation

7.1 src/include/Fasta/Fasta.hpp File Reference

```
#include <iostream> #include <fstream> #include <sstream> ×
#include <dirent.h> #include <iomanip> #include <algorithm> ×
#include <cmath> #include <unistd.h> #include <stdexcept> ×
#include <string> #include <vector> #include <unordered_-
map> #include <Fasta/FastaCap.hpp> #include <Fasta/Fasta-
Corp.hpp>
```

Classes

- class fastaplus::Fasta< Tint >

  Class for handling fasta records.

Namespaces

- namespace fastaplus

  The namespace of FastaPlus container.

7.1.1 Detailed Description

Utility classes and functions for Fasta files/records handling

7.2 src/include/Fasta/FastaCap.hpp File Reference

```
#include <iostream> #include <algorithm> #include <string> ×
#include <vector> #include <unordered_map>
```

Classes

- class fastaplus::FastaCap

  FastaCap class handles the information located in the header line of a fasta record.

Namespaces

- namespace fastaplus

  The namespace of FastaPlus container.

7.2.1 Detailed Description

Classes and functions for handling information within Fasta header

7.3 src/include/Fasta/FastaCorp.hpp File Reference

```
#include <iostream> #include <algorithm> #include <string> ×
#include <vector> #include <unordered_map> #include <unordered-
_set>
```

Classes

- class fastaplus::FastaCorp

  FastaCorp class processes the sequence of a given Fasta record.

Namespaces

- namespace fastaplus

  The namespace of FastaPlus container.

7.3.1 Detailed Description

Classes and functions for handling Fasta formated sequence