

NAME

w_list_t – generic list structures

SYNOPSIS

```

#include <w.h>
#include <w_list.h>
// for definition of offsetof(x,y):
#include <stddef.h>

class w_link_t;
class T {
    // your type
    ...
    w_link_t    _link;
    ...
};

// unsorted lists:
template <class T> class w_list_t;

// iterator over a w_list_t:
template <class T> class w_list_i;
template <class T> class w_list_const_i;

// sorted lists:
template <class T, class K> w_descend_list_t;
template <class T, class K> w_ascend_list_t;

```

DESCRIPTION

This is a set templates for managing doubly-linked lists of objects of type **T** (for user-defined types **T**). The double-linking of items into lists is accomplished with the class *w_link_t*, which must be a member of the type **T**. The template methods operate on the *w_link_t* member. The name of the member can be anything; the methods locate the member by information given when the list is constructed:

```
w_list_t<mytype> l(offsetof(mytype, mylink));
```

where the template parameter is the type:

```

class mytype {
    int          a;
    w_link_t     mylink;
    ...
    int          b;
};

```

The lists managed by these templates are of two general kinds: unsorted and sorted.

Unsorted lists

Unsorted lists (**w_list_t<T>**) are constructed as in the example given above.

Items are put into the list with the any of the following methods:

```

w_list_t<T>&    push(T* t);
T*            pop();    // reverse of push
w_list_t<T>&    append(T* t) ;
T*            chop();    //reverse of append

```

These methods return the objects at the front and rear of the lists:

```

T*    top();
T*    bottom();

```

A list can be printed with

```

friend ostream&    operator<<(
    ostream&        o,
    const w_list_t<T>&    l);

```

Unsorted lists are traversed with iterators (instances of **w_list_i<T>**), which have methods **next()**, **curr()**, and **reset()**.

```

{
    mytype    *p;
    w_list_i<mytype> iter(l);
    for (int i = 0; i < 10; i++) {
        p = iter.next();
        if ( p->a == .... // whatever you wish
    }
}

```

Sorted lists

Sorted lists (**w_descend_list_t<T,K>** and **w_ascend_list_t<T,K>**) are lists of objects containing **keys**, which are members of the template parameter class T, whose type is the template parameter type K.

Sorted lists are traversed by calling their methods

```

virtual T *search(const K &);

```

In order for the method **search** to work, the template has to find a member of the key type **K** in each instance of type T that is in the list. For this reason, each ordered list is constructed with the location of the key as well as the location of the **w_link_t**:

```

// order this list on the value of a in descending order
w_descend_list_t<mytype, int> l(
    offsetof(mytype, a),
    offsetof(mytype, mylink) // offset of link
);

// order this list on the value of b in ascending order
w_ascend_list_t<mytype, int> l(
    offsetof(mytype, b),
    offsetof(mytype, mylink) // offset of link
);

```

Objects are inserted into sorted lists with the method **put_in_order**:

```
virtual void    put_in_order(T* t);
```

Sorted lists can be traversed with iterators (**w_list_i**), and with these methods:

```
T*    first();  
T*    last();
```

In addition, methods derived from **w_list_i** such as **pop** can be used to remove items from the head list (e.g, for destroying the entire list).

DERIVING NEW LISTS

The methods **search** and **put_in_order** are declared virtual so that other list types can be derived from these templates.

BUGS

There are no methods for removing items from the middle of a list.

VERSION

This manual page applies to Version 1.1 of the Shore software.

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SEE ALSO

rc(fc), **intro(fc)**, **statistics(oc)**, **statistics(svas)**, and **statistics(ssm)**.