Plank's Jval and Dllist Libraries

CS350: Systems Programming

Instructor: Dr. Dorian Arnold
Computer Science, Emory University
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Jval: A generic “container” type

```
typedef union {
   int i;
   float f;
   double d;
   void *v;
   char *s;
   char c;
   ...
} Jval;
```

Always 8 bytes!

Jval Constructors

```
extern Jval new_jval_i(int);
extern Jval new_jval_f(float);
extern Jval new_jval_d(double);
extern Jval new_jval_v(void *);
extern Jval new_jval_s(char *);
extern Jval new_jval_c(char );
```

for initializing with a particular type and value

Jval Accessors

```
extern int jval_i(Jval);
extern float jval_f(Jval);
extern double jval_d(Jval);
extern void *jval_v(Jval);
extern char *jval_s(Jval);
extern char jval_c(Jval);
...
```

for extracting a particular type and value

dllist: A generic doubly-linked list container

```
typedef struct dllist {
  struct dllist *flink;
  struct dllist *blink;
  Jval val;
} *Dllist;
```

Dllist Functions

```
extern Dllist new_dllist();
```

allocate and return new list

```
extern free_dllist(Dllist l);
```

destroy `l`, freeing all memory. List can be non-empty.

```
extern dll_append(Dllist l, Jval v);
```

insert `v` at end of list, `l`

```
extern dll_prepend(Dllist l, Jval v);
```

insert `v` at beginning of list, `l`

```
extern dll_delete_node(Dllist n);
```

delete and free node `n`;

```
extern int dll_empty(Dllist l);
```

return 0 if `l` is empty, 1 otherwise

```
extern Jval dll_val(Dllist);
```

Useful Dllist Macros

`Dllist dll_first(l)`

returns first node in list, `l`, or sentinel if empty

`Dllist dll_last(d)`

returns last node in list, `l`, or sentinel if empty

`Dllist dll_next(n)`

returns next node after `n`, or sentinel if last

`Dllist dll_prev(d)`

returns previous node before `n`, or sentinel if first

`Dllist dll_nil(d)`

returns the sentinel node (`d`)

Useful Dllist Macros (cont'd)

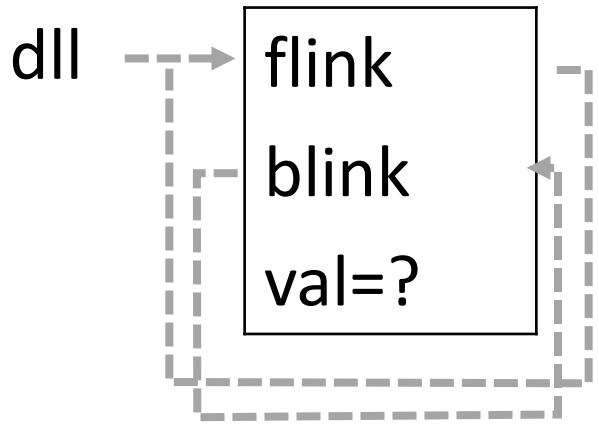
```
#define dll_traverse(ptr, list) \
  for (ptr = list->flink; ptr != list; ptr = ptr->flink)
```

traverse list, `l`, with node, `ptr`, for each iteration

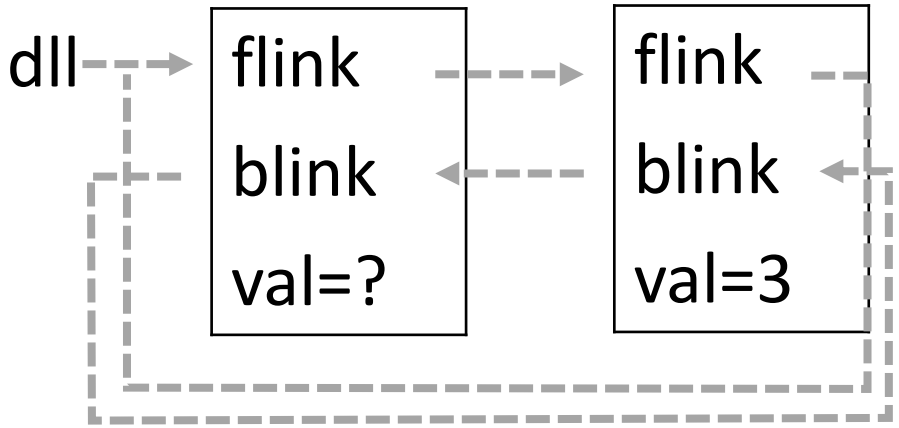
```
#define dll_rtraverse(ptr, list) \
  for (ptr = list->blink; ptr != list; ptr = ptr->blink)
```

traverse list, `l`, in reverse with node, `ptr`, for each iteration

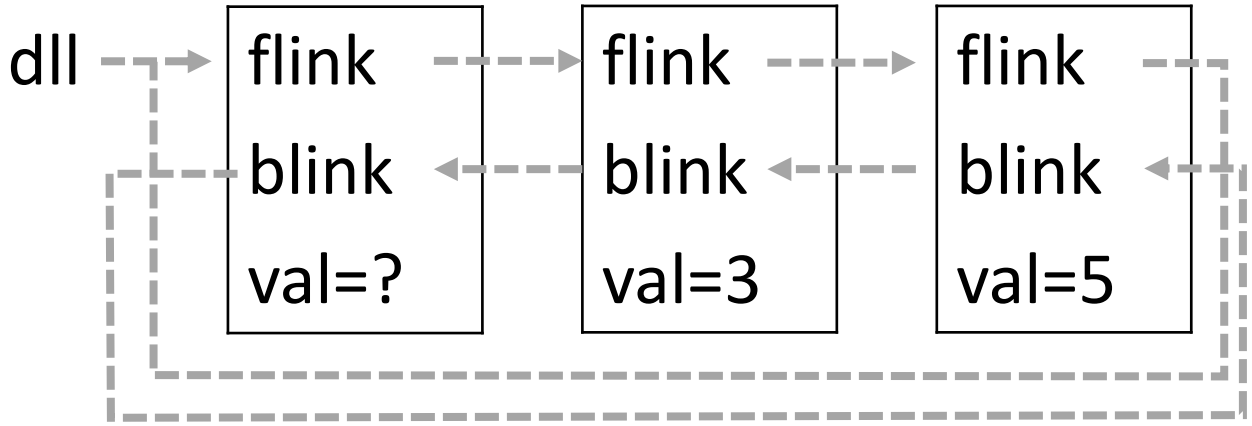
```
dll = new_dllist();
```




```
dll_append(l, new_jval_i(3));
```




```
dll_append(l, new_jval_i(5));
```




```
dll_delete( dll_first(dll) );
```