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1 ; Name      : list.asm
2 ;
3 ; Build      : aclocal && autoconf && automake --add-missing --foreign
4 ;
5 ;            mkdir build
6 ;            cd build
7 ;            ../configure
8 ;            make
9 ;
10 ;
11 ; Description : an example of glib 2.0 single linked lists
12 ;
13 bits 64
14
15 [list -]
16     extern    g_slist_append
17     extern    g_slist_free
18     extern    g_slist_insert
19     extern    g_slist_insert_sorted
20     extern    g_slist_prepend
21     extern    g_slist_reverse
22     extern    g_slist_sort
23     extern    g_slist_nth
24     extern    g_slist_find
25     extern    g_print
26     extern    strcmp
27     extern    exit
28 [list +]
29
30 section .rodata
31     names:
32     .fred:    db        "Fred",0
33     .susie:    db        "Susie",0
34     .frank:    db        "Frank",0
35     .wilma:    db        "Wilma",0
36     .mary:     db        "Mary",0
37     .joe:      db        "Joe",0
38     .mike:     db        "Mike",0
39     .tyler:    db        "Tyler",0
40     .amy:      db        "Amy",0
41     .zoe:      db        "Zoe",0
42
43     messages:
44     .original:    db        "original list",10,"-----",10,0
45     .reversinglist: db        10,"reversing list",10,"-----",10,0
46     .reversesorting: db        10,"reverse sorted list",10,"-----",10,0
47     .sorting:     db        10,"sorted list",10,"-----",10,0
48     .notfound:    db        "not found.",10,0
49     .found:       db        "found at %d.",10,0
50     .item:        db        "%s " ;don't separate this line with the next
51     .crlf:        db        10,0
52     .lookup:      db        "looking up %s : ",0
53
54 section .data
55
56     list:         dq        0 ;start of the list
57
58 section .text
59 global _start
60
61 _start:
62     ;add Fred, Susie, Frank and Wilma to the list
63     mov     rdi,[list]
64     mov     rsi,names.fred
65     call    g_slist_append
66     mov     [list],rax
67     mov     rdi,[list]
68     mov     rsi,names.susie
69     call    g_slist_append
70     mov     [list],rax
71     mov     rdi,[list]
72     mov     rsi,names.frank

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73     call    g_slist_append
74     mov     [list],rax
75     mov     rdi,[list]
76     mov     rsi,names.wilma
77     call    g_slist_append
78     mov     [list],rax
79     ;insert Joe at the front of the list
80     mov     rdi,[list]
81     mov     rsi,names.joe
82     call    g_slist_prepend
83     mov     [list],rax
84     ;insert Mary after the second position
85     mov     rdi,[list]
86     mov     rsi,names.mary
87     mov     rdx,2
88     call    g_slist_insert
89     mov     [list],rax
90     ;add names but sorted
91     mov     rdi,[list]
92     mov     rsi,names.amy
93     mov     rdx,List.Sort
94     call    g_slist_insert_sorted
95     mov     [list],rax
96     mov     rdi,[list]
97     mov     rsi,names.zoe
98     mov     rdx,List.Sort
99     call    g_slist_insert_sorted
100    mov     [list],rax
101    ;Show the list so far
102    mov     rdi,messages.original
103    xor     rax,rax
104    call    g_print
105    mov     rdi,[list]
106    call    List.Display
107    mov     rdi,messages.crlf
108    xor     rax,rax
109    call    g_print
110    ;lookup some names in the list
111    mov     rdi,[list]
112    mov     rsi,names.mike
113    call    List.Lookup
114    mov     rdi,[list]
115    mov     rsi,names.mary
116    call    List.Lookup
117    mov     rdi,[list]
118    mov     rsi,names.fred
119    call    List.Lookup
120    mov     rdi,[list]
121    mov     rsi,names.tyler
122    call    List.Lookup
123    ;reverse the list
124    mov     rdi,messages.reversinglist
125    call    g_print
126    mov     rdi,[list]
127    call    g_slist_reverse
128    mov     [list],rax
129    ;show revered list
130    mov     rdi,[list]
131    call    List.Display
132    ;sort the list alphabetically
133    mov     rdi,messages.sorting
134    call    g_print
135    mov     rdi,[list]
136    mov     rsi,List.Sort
137    call    g_slist_sort
138    mov     [list],rax
139    ;show sorted list
140    mov     rdi,[list]
141    call    List.Display
142    ;reversesort the list
143    mov     rdi,messages.reversesorting
144    call    g_print

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145     mov     rdi,[list]
146     mov     rsi,List.ReverseSort
147     call    g_slist_sort
148     mov     [list],rax
149     ;show sorted list
150     mov     rdi,[list]
151     call    List.Display
152     ;free the data
153     mov     rdi,[list]
154     call    g_slist_free
155     ;exit the program
156     xor     rdi,rdi
157     call    exit
158
159 List:
160 .Lookup:
161     ;int 3
162     ;rdi has pointer to list
163     ;rsi has pointer to name which we're looking for
164     push    rbp
165     mov     rbp, rsp
166     push    rdi
167     push    rsi
168     mov     rdi, messages.lookup
169     xor     rax, rax
170     call    g_print
171     pop     rsi
172     pop     rdi
173     call    g_slist_find
174     mov     rdi, messages.notfound
175     ;rax has either zero or the item pointer
176     and     rax, rax
177     jz      .print
178     mov     rsi, rax
179     mov     rdi, messages.found
180     xor     rax, rax
181 .print:
182     call    g_print
183     mov     rsp, rbp
184     pop     rbp
185     ret
186
187 .Display:
188     push    rbp
189     mov     rbp, rsp
190     sub     rsp, 0x0
191     mov     r15, rdi
192     xor     rsi, rsi                ;index = 0
193 .repeat:
194     xor     rax, rax
195     mov     rdi, r15
196     call    g_slist_nth            ;get nth item in the list
197     and     rax, rax
198     jz      .done
199     push    rdi
200     push    rsi
201     mov     rsi, [rax]
202     mov     rdi, messages.item
203     xor     rax, rax
204     call    g_print
205     pop     rsi
206     pop     rdi
207     inc     esi
208     jmp     .repeat
209 .done:
210     mov     rsp, rbp
211     pop     rbp
212     ret
213
214 .ReverseSort:
215     ;reverse sorting is fairly easy now, just swap rdi and rsi
216     xor     rdi, rsi

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217     xor     rsi,rdi
218     xor     rdi,rsi
219     ;and compare after the swap
220 .Sort:
221     ;compare strings in rdi and rsi, returning
222     ;-1 when string rdi comes before string rsi
223     ; 0 when both strings are equal
224     ; 1 when string in rsi comes after string rdi
225     call    strcmp
226     ret
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