

Sorting and reversing lists

```
0;text-align:right}#u a{margin:0 5px}#u .reg{margin:0}#m{width:720px;margin:0 auto;}#nv a,#nv b,.btn,#lk{font-size:14px}#fm{padding-left:110px;text-align:left}input{border:0;padding:0}#nv{height:19px;font-size:16px;margin:0 0 4px;text-align:left;text-indent:137px;}#s_ipt_wr{width:418px;height:30px;display:inline-block;margin-right:5px;background:url(http://s1.bdstatic.com/r/www/1.0.0.png) no-repeat -304px 0;border:1px solid #b6b6b6;border-color:#9a9a9a #cdcdcd #cdcdcd #9a9a9a;vertical-align:top}#s_ipt{width:405px;height:22px;font:16px/22px arial;margin:5px 0 7px;background:#fff;outline:none;-webkit-appearance:none}#s_btn{width:95px;height:32px;padding-top:2px}#9;font-size:14px;background:#ddd url(http://s1.bdstatic.com/r/www/1.0.0.png);cursor:pointer}#s_btn_h{background-position:-100px 0}#s_btn_wr{width:97px;height:34px;display:inline-block;background:url(http://s1.bdstatic.com/r/www/img/i-1.0.0.png) no-repeat -202px 0;position:relative;z-index:0;vertical-align:top}#s_btn_h{background-position:-100px 0}#s_btn_wr{width:97px;height:34px;display:inline-block;background:url(http://s1.bdstatic.com/r/www/img/bg-1.0.0.gif) no-repeat right -134px;background-position:right -136px}#mCon span{color:#00c;cursor:default;display:block}#mCon .hw{text-decoration:underline;cursor:pointer}#mMenu a{width:1008;height:1008;display:block;line-height:22px;text-indent:6px;text-decoration:none;filter:none}#mMenu,#user ul{box-shadow:2px 2px #ccc;-moz-box-shadow:1px 1px 2px #ccc;-webkit-box-shadow:1px 1px 2px #ccc;filter:progid:DXImageTransform.Microsoft.Shadow(Shadow1=135, Color="#cccccc")\9;}#mMenu{width:566px;border:1px solid #9b9b9b;list-style-type:none;position:absolute;right:27px;top:28px;display:none;background:#fff}#mMenu a:hover{background:#ebeb}#mMenu .ln{height:1px;background:#ebeb;overflow:hidden;font-size:1px;line-height:1px;margin-top:-1px}#cp,#cp a{color:#77c}#seth{display:none;behavior:url(#default#homepage)}#setf{display:none;}#sekj{margin-left:14px;}</style><script type="text/javascript">function h(obj){obj.style.behavior='url(#default#homepage)';var a = obj.setHomePage('http://www.b</script></head>
```

<body>

<div id="ie6tipcon"></div>

```
<div id="u"><a href="http://www.baidu.com/gaoji/preferences.html" name="tj_setting">ËÑÊ-ËëÖÀ</a>|<a href="https://passport.baidu.com/login?tpl=mn&u=http%3A%2F%2Fwww.baidu.com%2F" name="tj_login" id="lb" onclick="return false;">µÇÀ</a><a href="https://passport.baidu.com/reg?regType=1&tpl=mn&u=http%3A%2F%2Fwww.baidu.com%2F" target="_blank" name="tj_reg" class="reg">×ç²Á</a></div>
<div id="m"><p id="lg"></p>
<p id="nv"><a href="http://news.baidu.com">ÐÀÀ&nbsp;þ;ÏÀ</a>|<b>ï&nbsp;þ;ð³</b>|<a href="http://tieba.baidu.com">ìù&nbsp;þ;Ë</a>|<i<
href="http://zhidao.baidu.com">ð&nbsp;þ;µÀ</a>|<a href="http://mp3.baidu.com">MP3</a>|<a href="http://image.baidu.com">Ï&nbsp;þ;þ;
href="http://video.baidu.com">Ð&nbsp;þ;þ;þ;µ;À</a>|<a href="http://map.baidu.com">þ&nbsp;þ;þ;þ;Ï</a></p><div id="fm"><form name="f" action=
class="s_ipt_wr"><input type="text" name="wd" id="kw" maxlength="100" class="s_ipt"></span><input type="hidden" name="rsv_bp" va
type="hidden" name="rsv_spt" value="3"><span class="s_btn_wr"><input type="submit" value="ÛÜËÖ.ÏÀ" id="su" class="s_btn"
onmousedown="this.className='s_btn s_btn_h'" onmouseover="this.className='s_btn'"></span></form><span class="tools"><span id="mHo
id="mCon"><span>ËÄËË</span></div></span></span><ul id="mMenu"><li><a href="#" name="ime_hw">ËÖÐ</a></li><li><a href="#" name=
Öö</a></li><li class="ln"></li><li><a href="#" name="ime_cl">¹ðÖ</a></li></ul></div>
<p id="lk"><a href="http://baike.baidu.com">ÛÜË</a>|<a href="http://wenku.baidu.com">ÏÀÏÀ</a>|<a href="http://www.hao123.com">
<span> | <a href="http://www.baidu.com/more/">ü&á&gt;&gt;</a></span></p><p id="lm"></p><p ><a id="seth" onClick="h(this)" href=
onmousedown="return ns_c({'fm':'behs','tab':'homepage','pos':0})">ÑÛÜËËËËËð&ð³</a><a id="setf"
href="http://www.baidu.com/cache/sethelp/index.html" onmousedown="return ns_c({'fm':'behs','tab':'favorites','pos':0})" target="
ÛÜËËËËËð&ð³</a><span id="sekj"><a href="http://www.baidu.com/search/baidukuijie_mp.html" target="_blank" onmousedown="return
ns_c({'fm':'behs','tab':'kuaijie','pos':1})">ÑÛÜËËËËËð&ð³&À&lt;/a></span></p>
<p id="lh"><a href="http://e.baidu.com?refer=888">çÖËËÛÜËËËËËð&ð³</a> | <a href="http://top.baidu.com">ËÑÊ-çÖË&ñ</a> | <a
href="http://home.baidu.com">¹ðÖðÜË</a> | <a href="http://ir.baidu.com">About Baidu</a></p><p id="cp">&copy;2012 Baidu <a href=
ÛÜËËË&ð³&À</a> <a href="http://www.miibeian.gov.cn" target="_blank">¼&ICPð&030173&À</a> <script type="text/javascript" src="http://sl.bdstatic.com/r/www/cache/global/js/home-1.6.js"></script><script>var bdUs
w=window,d=document,n=navigator,k=d.f.wd,a=d.getElementById("nv").getElementsByName("a"),isIE=n.userAgent.indexOf("MSIE")!=1
(function(){if(/q=(.*)/.test(location.search)){k.value=decodeURIComponent(RegExp("%x241"))}});if(n.cookieEnabled&!/sug?=/0/
{bds.se.sug()};function addEV(o,e,f){if(w.attachEvent){o.attachEvent("on"+e,f)}else if(w.addEventListener){o.addEventListener
false};function G(id){return d.getElementById(id)};function ns_c(q){var p=encodeURIComponent(window.document.location.href),
',mu="',img=window["BD_PS_C"]+(new Date()).getTime())=new Image();for(v in q){sV=q[v];sQ+=v+"="+sV+"&"}mu=
img.src="http://nsclick.baidu.com/v.gif?pid=201&pj=www&rsv_sid=&"+sQ+"&path="+p+"&ts="+new Date().getTime();return true};if
[12]/.test(d.cookie)})(document.write("<script src='http://sl.bdstatic.com/r/www/cache/ime/js/opamine-1.0.0.js'></script>");)(func
G("u").getElementsByName("a"),nv=G("nv").getElementsByName("a"),lk=G("lk").getElementsByName("a"),un="";var tj
["news","tieba","zhidao","mp3","img","video","map"];var tj_lk=["baike","wenku","hao123","more"];un=bds.comm.user=="?"?"":
bds.comm.user;function _addTj(obj){addEV(obj,"mousedown",function(e){var e=e||window.event;var target=e.target||
e.srcElement;ns_c({'fm':'behs','tab':target.name,'tj_user':un,encodeURIComponent(un)});for(var i=0;i<u.length;i++)
[_addTj[u[i]]];for(var i=0;i<nv.length;i++){nv[i].name='tj'+tj_nv[i];for(var i=0;i<lk.length;i++){lk[i].name=
tj_lk[i];}}})();(function(){var links=['tj_news':['word','http://news.baidu.com/ns?tn=news&cl=2&rn=20&ct=1&ie=utf-8'],'tj_
'http://tieba.baidu.com/f?ie=utf-8'],'tj_zhidao':['word','http://zhidao.baidu.com/search?pn=0&rn=10&lm=0'],'tj_mp3':['word
'http://mp3.baidu.com/mp?ms&tn=baidump3&ct=134217728&rn=&lm=&pn=30&ie=utf-8'],'tj_img':['word','http://image.baidu.com/i
ct=201326592&cl=2&nc=1&lm=1&st=1&tn=baiduimage&istype=2&fm=&pv=&z=0&ie=utf-8'],'tj_video':['word','http://video.baidu.com/v
ct=301989888&se=25&ie=utf-8'],'tj_map':['wd','http://map.baidu.com/?newmap=1&ie=utf-8&s=s'],'tj_baike':['word',
'http://baike.baidu.com/search/worldpic=1&sug=1&enc=utf8'],'tj_wenku':['word','http://wenku.baidu.com/search?ie=utf-8'];var
[G('nv'),G('lk')],kw=G('kw');for(var i=0,l=domArr.length;i<l;i++){domArr[i].onmousedown=function(e){e=e||w.t
target=e.target||e.srcElement,name=target.getAttribute('name'),items=links[name],reg=new RegExp('^\\s+|\\s+$|x241'),key
kw.value.replace(reg,'');if(items){if(key.length>0){var wd=items[0],url=items[1],url=url+(name==='tj_map'?
encodeURIComponent('&wd'+wd+'&key'):(url.indexOf('?')>0?'&':'')&wd+'&'+encodeURIComponent(key))};tar
else{target.href=target.href.match(new RegExp('^http://.+\\.baidu\\.com/'))[0];}name&&ns_c({'fm':'behs','tab':name,'query
encodeURIComponent(key),'un':encodeURIComponent(bds.comm.user||'')});}}})();addEV(w,"load",function(){k.focus()});w.onun
ty</script><script type="text/javascript" src="http://sl.bdstatic.com/r/www/cache/global/js/tangram-1.3.4c1.0.js"></script><scr
type="text/javascript" src="http://sl.bdstatic.com/r/www/cache/user/js/u1.3.4.js"></script><!-- IF IE 6!--></endif-->
```

</html>

<!--c35a3a95824fd856-->

Serialization and deserialization

Python native "pickle"

```
In [10]: import pickle
d = {'foo': [ 1,2,3], 'bar': (1+2j), 'baz': (1,2) }
d_pickle = pickle.dumps(d)
d_pickle
```

```
Out[10]: "(dp0\nS'baz'\npl\n(I1\nI2\ntp2\nsS'foo'\np3\n(lp4\nI1\naI2\naI3\nasS'bar'\np5\nnc__builtin__\ncomplex\np6\n(F1.0\nF2.0\ntp7\nRp8\
```

```
In [11]: d_unpickle = pickle.loads(d_pickle)
d_unpickle
```

```
Out[11]: {'bar': (1+2j), 'baz': (1, 2), 'foo': [1, 2, 3]}
```

JSON

```
In [12]: import json
d = {'foo': [ 1,2,3], 'bar': 'This is bar', 'baz': {1:2} }
d_json = json.dumps(d)
d_json
```

```
Out[12]: '{"baz": {"1": 2}, "foo": [1, 2, 3], "bar": "This is bar"}'
```

```
In [13]: json.loads(d_json)
```

```
Out[13]: {u'bar': u'This is bar', u'baz': {u'1': 2}, u'foo': [1, 2, 3]}
```

Comma-separated value (CSV)

```
In [14]: from StringIO import StringIO
import csv
```

```
In [15]: fp = StringIO()
writer = csv.writer(fp)
writer.writerow([1,2,3,4,5,6])
writer.writerow(['this', 'is', 'comma', 'separated value,'])
writer.writerow(['and', 'this', 'can', 'be', 'read', 'by', 'excel'])
```

```
In [16]: print fp.getvalue()
```

```
1,2,3,4,5,6
this,is,comma,"separated value,"
and,this,can,be,read,by,excel
```

```
In [17]: fp.seek(0)
reader = csv.reader(fp)
for row in reader:
    print row
```

```
['1', '2', '3', '4', '5', '6']
['this', 'is', 'comma', 'separated value,']
['and', 'this', 'can', 'be', 'read', 'by', 'excel']
```

Filename matching

```
In [18]: import glob
glob.glob('*.ipynb')
```

```
Out[18]: ['01-BasicPythonSyntax.ipynb',
'02-Builtins.ipynb',
'03-FileIO.ipynb',
'04-UsingModules.ipynb',
'05-Strings.ipynb',
'06-Regex.ipynb',
'07-Functions.ipynb',
'08-AdvancedFunctions.ipynb',
'09-Logging.ipynb',
'10-OOP1.ipynb',
'11-OOP2.ipynb',
```

```
'12-Decorators.ipynb',
'13-GeneratorsAndIterators.ipynb',
'14-ContextManagers.ipynb',
'17-Subprocess.ipynb',
'20-MoreModules.ipynb']
```

Print "pretty" output

```
In [19]: import pprint
```

```
In [20]: x = [{'baz': {1: (2,x)}}, 'foo': [1, 2, 3], 'bar': 'This is bar']
          for x in range(10) ]
          print x
```

```
[{'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 0)}}, {'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 1)}},
{'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 2)}}, {'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 3)}},
{'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 4)}}, {'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 5)}},
{'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 6)}}, {'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 7)}},
{'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 8)}}, {'bar': 'This is bar', 'foo': [1, 2, 3], 'baz': {1: (2, 9)}}]
```

```
In [21]: pprint.pprint(x)
```

```
[{'bar': 'This is bar', 'baz': {1: (2, 0)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 1)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 2)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 3)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 4)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 5)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 6)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 7)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 8)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 9)}, 'foo': [1, 2, 3]}]
```

```
In [22]: print 'x is \n%s' % pprint.pformat(x)
```

```
x is
[{'bar': 'This is bar', 'baz': {1: (2, 0)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 1)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 2)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 3)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 4)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 5)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 6)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 7)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 8)}, 'foo': [1, 2, 3]},
{'bar': 'This is bar', 'baz': {1: (2, 9)}, 'foo': [1, 2, 3]}]
```

random numbers

```
In [23]: import random
```

```
In [24]: random.random()
```

```
Out[24]: 0.6208437699012457
```

```
In [25]: random.randint(1, 100)
```

```
Out[25]: 10
```

```
In [26]: x = range(10)
          random.shuffle(x)
          x
```

```
Out[26]: [5, 6, 9, 1, 0, 3, 7, 8, 4, 2]
```

