

# Introduction to JSON (JavaScript Object Notation)

- Psychometric Conference 2016
- Ou Zhang



# Topic

- What is JSON?
- JSON Feature
- JSON Structure
- JSON Example
- JSON Parse Tools
- Online Editor Introduction

# What is JSON?

- The JSON file (JavaScript Object Notation) is an open standard format that uses human-readable text to transmit data objects. It is the most common data format used for browser/server communication, largely replacing XML.
- JSON is a language-independent data format. It derived from JavaScript, but now code to generate and parse JSON-format data is available in many programming languages.
- JSON is a text format and the JSON filename extension is .json.

# JSON Feature

- Lightweight data-interchange format
- Compared to XML → Simple format
- Easy for humans to read and write
- Easy for machines to parse and generate
- Programming language independent

```
{  
  "firstName": "John",  
  "lastName": "Smith",  
  "isAlive": true,  
  "age": 25,  
  "address": {  
    "streetAddress": "21 2nd Street",  
    "city": "New York",  
    "state": "NY",  
    "postalCode": "10021-3100"  
  },  
  "phoneNumbers": [  
    {  
      "type": "home",  
      "number": "212 555-1234"  
    },  
    .  
  ]  
}
```

# JSON Structures

- A collection of name/value pairs
  - An object, record, dictionary, hash table, keyed list, or associative array
- An ordered list of values
  - An array, vector, list, or sequence
- A JSON object begins with { (left brace) and ends with } (right brace)
- Each name is followed by : (colon) and the name/value pairs are separated by , (comma)

```
{  
  "firstName": "John",  
  "lastName": "Smith",  
  "isAlive": true,  
  "age": 25,  
  "address": {  
    "streetAddress": "21 2nd Street",  
    "city": "New York",  
    "state": "NY",  
    "postalCode": "10021-3100"  
  },  
  "phoneNumbers": [  
    {  
      "type": "home",  
      "number": "212 555-1234"  
    },  
    .  
  ]  
}
```

# JSON Example

- JSON:

```
1 {
2   "DeviceProperties": {
3     "DeviceName": "iPad Air(GSM)",
4     "DeviceVersion": "iPad4,2",
5     "System": {
6       "OSVersion": "9.2.1",
7       "UUID": "9205715B-F4C4-48F2-8B5F-1D46270BC527"
8     },
9     "Camera": {
10      "Resolution": {
11        "Width": 1280,
12        "Height": 720
13      },
14      "FOV": 59.34,
15      "FrameRate": 30,
16      "ExposureSettings": {
17        "ExposureDuration": 0.550000011920929,
18        "ISO": 50
19      },
20      "CaptureDevicePosition": 2
21    },
22  },
23  "PeripheralProperties": {
24    "KeyBoardLatency": 0
25  },
26  "SubjectData": {
27    "MedicalRecordNo": "",
28    "FirstName": "Stuart",
29    "LastName": "Red",
30    "Gender": "M",
31    "DOB": "02/18/2006",
32    "Age": 10,
33    "Grade": "N/A",
34    "Height": {
35      "Amount": null,
36      "Unit": null
37    },
38    "Weight": {
39      "Amount": null,
40      "Unit": null
41    },
42    "RegistrationInfo": {
43      "RegistrationID": "",
44      "Comments": ""
```

- Data Structure:

```
object {10}
└─ DeviceProperties {4}
   DeviceName : iPad Air(GSM)
   DeviceVersion : iPad4,2
└─ System {2}
   OSVersion : 9.2.1
   UUID : 9205715B-F4C4-48F2-8B5F-1D46270BC527
└─ Camera {5}
   Resolution {2}
   FOV : 59.34
   FrameRate : 30
   ExposureSettings {2}
   CaptureDevicePosition : 2
└─ PeripheralProperties {1}
   KeyBoardLatency : 0
└─ SubjectData {10}
└─ TestInformation {22}
└─ MotionTrackingParameters {5}
└─ CustomScriptInformation {1}
└─ AttentionData [450]
   0 {9}
   TestEpisodeNumber : 0
   Duration : 2000
   Symbol : 8
   ResponseTime : 415
   Presentation : 200
```

# JSON Parse Tools

- the C family of languages, including C, C++ , C#, Java, JavaScript, Perl, Python
- SAS “PROC GROOVY”
  - <http://support.sas.com/resources/papers/proceedings16/1660-2016.pdf>
- R tools
  - 3 R-packages-“jsonlite”, “rjson”, “RJSONIO”
  - (*R-package comparison code is available in the folder*)
- Online Editor: <http://www.jsoneditoronline.org/>

# Online Editor Introduction

Copy/paste JSON text in the Left window

Press 'right arrow' button to parse text

If necessary, click 'left arrow' button to make JSON text more structured.

Check nested data structure in the Right window

```

1 {
2   "DeviceProperties": {
3     "DeviceName": "iPad Air(GSM)",
4     "DeviceVersion": "iPad4,2",
5     "System": {
6       "OSVersion": "9.2.1",
7       "UUID": "9205715B-F4C4-48F2-8B5F-1D46270BC527"
8     },
9     "Camera": {
10      "Resolution": {
11        "Width": 1280,
12        "Height": 720
13      },
14      "FOV": 59.34,
15      "FrameRate": 30,
16      "ExposureSettings": {
17        "ExposureDuration": 0.550000011920929,
18        "ISO": 50
19      },
20      "CaptureDevicePosition": 2
21    }
22  },
23  "PeripheralProperties": {
24    "KeyboardLatency": 0
25  },
26  "SubjectData": {
27    "MedicalRecordNo": "",
28    "FirstName": "Stuart",
29    "LastName": "Red",
30    "Gender": "M",
31    "DOB": "02/18/2006",
32    "Age": 10,
33    "Grade": "N/A",
34    "Height": {
35      "Amount": null,
36      "Unit": null
37    },
38  },
39  "TestInformation": {
40    "MotionTrackingParameters": {
41      "MotionTrackingParameters": {
42        "MotionTrackingParameters": {
43          "MotionTrackingParameters": {
44            "MotionTrackingParameters": {
45              "MotionTrackingParameters": {
46                "MotionTrackingParameters": {
47                  "MotionTrackingParameters": {
48                    "MotionTrackingParameters": {
49                      "MotionTrackingParameters": {
50                        "MotionTrackingParameters": {
51                          "MotionTrackingParameters": {
52                            "MotionTrackingParameters": {
53                              "MotionTrackingParameters": {
54                                "MotionTrackingParameters": {
55                                  "MotionTrackingParameters": {
56                                    "MotionTrackingParameters": {
57                                      "MotionTrackingParameters": {
58                                        "MotionTrackingParameters": {
59                                          "MotionTrackingParameters": {
60                                            "MotionTrackingParameters": {
61                                              "MotionTrackingParameters": {
62                                                "MotionTrackingParameters": {
63                                                  "MotionTrackingParameters": {
64                                                    "MotionTrackingParameters": {
65                                                      "MotionTrackingParameters": {
66                                                        "MotionTrackingParameters": {
67                                                          "MotionTrackingParameters": {
68                                                            "MotionTrackingParameters": {
69                                                              "MotionTrackingParameters": {
70                                                                "MotionTrackingParameters": {
71                                                                }
72                                                              }
73                                                            }
74                                                          }
75                                                        }
76                                                      }
77                                                    }
78                                                    }
79                                                  }
80                                                  }
81                                                  }
82                                                  }
83                                                  }
84                                                  }
85                                                  }
86                                                  }
87                                                  }
88                                                  }
89                                                  }
90                                                  }
91                                                  }
92                                                  }
93                                                  }
94                                                  }
95                                                  }
96                                                  }
97                                                  }
98                                                  }
99                                                  }
100                                                  }
101                                                  }
102                                                  }
103                                                  }
104                                                  }
105                                                  }
106                                                  }
107                                                  }
108                                                  }
109                                                  }
110                                                  }
111                                                  }
112                                                  }
113                                                  }
114                                                  }
115                                                  }
116                                                  }
117                                                  }
118                                                  }
119                                                  }
120                                                  }
121                                                  }
122                                                  }
123                                                  }
124                                                  }
125                                                  }
126                                                  }
127                                                  }
128                                                  }
129                                                  }
130                                                  }
131                                                  }
132                                                  }
133                                                  }
134                                                  }
135                                                  }
136                                                  }
137                                                  }
138                                                  }
139                                                  }
140                                                  }
141                                                  }
142                                                  }
143                                                  }
144                                                  }
145                                                  }
146                                                  }
147                                                  }
148                                                  }
149                                                  }
150                                                  }
151                                                  }
152                                                  }
153                                                  }
154                                                  }
155                                                  }
156                                                  }
157                                                  }
158                                                  }
159                                                  }
160                                                  }
161                                                  }
162                                                  }
163                                                  }
164                                                  }
165                                                  }
166                                                  }
167                                                  }
168                                                  }
169                                                  }
170                                                  }
171                                                  }
172                                                  }
173                                                  }
174                                                  }
175                                                  }
176                                                  }
177                                                  }
178                                                  }
179                                                  }
180                                                  }
181                                                  }
182                                                  }
183                                                  }
184                                                  }
185                                                  }
186                                                  }
187                                                  }
188                                                  }
189                                                  }
190                                                  }
191                                                  }
192                                                  }
193                                                  }
194                                                  }
195                                                  }
196                                                  }
197                                                  }
198                                                  }
199                                                  }
200                                                  }
201                                                  }
202                                                  }
203                                                  }
204                                                  }
205                                                  }
206                                                  }
207                                                  }
208                                                  }
209                                                  }
210                                                  }
211                                                  }
212                                                  }
213                                                  }
214                                                  }
215                                                  }
216                                                  }
217                                                  }
218                                                  }
219                                                  }
220                                                  }
221                                                  }
222                                                  }
223                                                  }
224                                                  }
225                                                  }
226                                                  }
227                                                  }
228                                                  }
229                                                  }
230                                                  }
231                                                  }
232                                                  }
233                                                  }
234                                                  }
235                                                  }
236                                                  }
237                                                  }
238                                                  }
239                                                  }
240                                                  }
241                                                  }
242                                                  }
243                                                  }
244                                                  }
245                                                  }
246                                                  }
247                                                  }
248                                                  }
249                                                  }
250                                                  }
251                                                  }
252                                                  }
253                                                  }
254                                                  }
255                                                  }
256                                                  }
257                                                  }
258                                                  }
259                                                  }
260                                                  }
261                                                  }
262                                                  }
263                                                  }
264                                                  }
265                                                  }
266                                                  }
267                                                  }
268                                                  }
269                                                  }
270                                                  }
271                                                  }
272                                                  }
273                                                  }
274                                                  }
275                                                  }
276                                                  }
277                                                  }
278                                                  }
279                                                  }
280                                                  }
281                                                  }
282                                                  }
283                                                  }
284                                                  }
285                                                  }
286                                                  }
287                                                  }
288                                                  }
289                                                  }
290                                                  }
291                                                  }
292                                                  }
293                                                  }
294                                                  }
295                                                  }
296                                                  }
297                                                  }
298                                                  }
299                                                  }
300                                                  }
301                                                  }
302                                                  }
303                                                  }
304                                                  }
305                                                  }
306                                                  }
307                                                  }
308                                                  }
309                                                  }
310                                                  }
311                                                  }
312                                                  }
313                                                  }
314                                                  }
315                                                  }
316                                                  }
317                                                  }
318                                                  }
319                                                  }
320                                                  }
321                                                  }
322                                                  }
323                                                  }
324                                                  }
325                                                  }
326                                                  }
327                                                  }
328                                                  }
329                                                  }
330                                                  }
331                                                  }
332                                                  }
333                                                  }
334                                                  }
335                                                  }
336                                                  }
337                                                  }
338                                                  }
339                                                  }
340                                                  }
341                                                  }
342                                                  }
343                                                  }
344                                                  }
345                                                  }
346                                                  }
347                                                  }
348                                                  }
349                                                  }
350                                                  }
351                                                  }
352                                                  }
353                                                  }
354                                                  }
355                                                  }
356                                                  }
357                                                  }
358                                                  }
359                                                  }
360                                                  }
361                                                  }
362                                                  }
363                                                  }
364                                                  }
365                                                  }
366                                                  }
367                                                  }
368                                                  }
369                                                  }
370                                                  }
371                                                  }
372                                                  }
373                                                  }
374                                                  }
375                                                  }
376                                                  }
377                                                  }
378                                                  }
379                                                  }
380                                                  }
381                                                  }
382                                                  }
383                                                  }
384                                                  }
385                                                  }
386                                                  }
387                                                  }
388                                                  }
389                                                  }
390                                                  }
391                                                  }
392                                                  }
393                                                  }
394                                                  }
395                                                  }
396                                                  }
397                                                  }
398                                                  }
399                                                  }
400                                                  }
401                                                  }
402                                                  }
403                                                  }
404                                                  }
405                                                  }
406                                                  }
407                                                  }
408                                                  }
409                                                  }
410                                                  }
411                                                  }
412                                                  }
413                                                  }
414                                                  }
415                                                  }
416                                                  }
417                                                  }
418                                                  }
419                                                  }
420                                                  }
421                                                  }
422                                                  }
423                                                  }
424                                                  }
425                                                  }
426                                                  }
427                                                  }
428                                                  }
429                                                  }
430                                                  }
431                                                  }
432                                                  }
433                                                  }
434                                                  }
435                                                  }
436                                                  }
437                                                  }
438                                                  }
439                                                  }
440                                                  }
441                                                  }
442                                                  }
443                                                  }
444                                                  }
445                                                  }
446                                                  }
447                                                  }
448                                                  }
449                                                  }
450                                                  }
451                                                  }
452                                                  }
453                                                  }
454                                                  }
455                                                  }
456                                                  }
457                                                  }
458                                                  }
459                                                  }
460                                                  }
461                                                  }
462                                                  }
463                                                  }
464                                                  }
465                                                  }
466                                                  }
467                                                  }
468                                                  }
469                                                  }
470                                                  }
471                                                  }
472                                                  }
473                                                  }
474                                                  }
475                                                  }
476                                                  }
477                                                  }
478                                                  }
479                                                  }
480                                                  }
481                                                  }
482                                                  }
483                                                  }
484                                                  }
485                                                  }
486                                                  }
487                                                  }
488                                                  }
489                                                  }
490                                                  }
491                                                  }
492                                                  }
493                                                  }
494                                                  }
495                                                  }
496                                                  }
497                                                  }
498                                                  }
499                                                  }
500                                                  }
501                                                  }
502                                                  }
503                                                  }
504                                                  }
505                                                  }
506                                                  }
507                                                  }
508                                                  }
509                                                  }
510                                                  }
511                                                  }
512                                                  }
513                                                  }
514                                                  }
515                                                  }
516                                                  }
517                                                  }
518                                                  }
519                                                  }
520                                                  }
521                                                  }
522                                                  }
523                                                  }
524                                                  }
525                                                  }
526                                                  }
527                                                  }
528                                                  }
529                                                  }
530                                                  }
531                                                  }
532                                                  }
533                                                  }
534                                                  }
535                                                  }
536                                                  }
537                                                  }
538                                                  }
539                                                  }
540                                                  }
541                                                  }
542                                                  }
543                                                  }
544                                                  }
545                                                  }
546                                                  }
547                                                  }
548                                                  }
549                                                  }
550                                                  }
551                                                  }
552                                                  }
553                                                  }
554                                                  }
555                                                  }
556                                                  }
557                                                  }
558                                                  }
559                                                  }
560                                                  }
561                                                  }
562                                                  }
563                                                  }
564                                                  }
565                                                  }
566                                                  }
567                                                  }
568                                                  }
569                                                  }
570                                                  }
571                                                  }
572                                                  }
573                                                  }
574                                                  }
575                                                  }
576                                                  }
577                                                  }
578                                                  }
579                                                  }
580                                                  }
581                                                  }
582                                                  }
583                                                  }
584                                                  }
585                                                  }
586                                                  }
587                                                  }
588                                                  }
589                                                  }
590                                                  }
591                                                  }
592                                                  }
593                                                  }
594                                                  }
595                                                  }
596                                                  }
597                                                  }
598                                                  }
599                                                  }
600                                                  }
601                                                  }
602                                                  }
603                                                  }
604                                                  }
605                                                  }
606                                                  }
607                                                  }
608                                                  }
609                                                  }
610                                                  }
611                                                  }
612                                                  }
613                                                  }
614                                                  }
615                                                  }
616                                                  }
617                                                  }
618                                                  }
619                                                  }
620                                                  }
621                                                  }
622                                                  }
623                                                  }
624                                                  }
625                                                  }
626                                                  }
627                                                  }
628                                                  }
629                                                  }
630                                                  }
631                                                  }
632                                                  }
633                                                  }
634                                                  }
635                                                  }
636                                                  }
637                                                  }
638                                                  }
639                                                  }
640                                                  }
641                                                  }
642                                                  }
643                                                  }
644                                                  }
645                                                  }
646                                                  }
647                                                  }
648                                                  }
649                                                  }
650                                                  }
651                                                  }
652                                                  }
653                                                  }
654                                                  }
655                                                  }
656                                                  }
657                                                  }
658                                                  }
659                                                  }
660                                                  }
661                                                  }
662                                                  }
663                                                  }
664                                                  }
665                                                  }
666                                                  }
667                                                  }
668                                                  }
669                                                  }
670                                                  }
671                                                  }
672                                                  }
673                                                  }
674                                                  }
675                                                  }
676                                                  }
677                                                  }
678                                                  }
679                                                  }
680                                                  }
681                                                  }
682                                                  }
683                                                  }
684                                                  }
685                                                  }
686                                                  }
687                                                  }
688                                                  }
689                                                  }
690                                                  }
691                                                  }
692                                                  }
693                                                  }
694                                                  }
695                                                  }
696                                                  }
697                                                  }
698                                                  }
699                                                  }
700                                                  }
701                                                  }
702                                                  }
703                                                  }
704                                                  }
705                                                  }
706                                                  }
707                                                  }
708                                                  }
709                                                  }
710                                                  }
711                                                  }
712                                                  }
713                                                  }
714                                                  }
715                                                  }
716                                                  }
717                                                  }
718                                                  }
719                                                  }
720                                                  }
721                                                  }
722                                                  }
723                                                  }
724                                                  }
725                                                  }
726                                                  }
727                                                  }
728                                                  }
729                                                  }
730                                                  }
731                                                  }
732                                                  }
733                                                  }
734                                                  }
735                                                  }
736                                                  }
737                                                  }
738                                                  }
739                                                  }
740                                                  }
741                                                  }
742                                                  }
743                                                  }
744                                                  }
745                                                  }
746                                                  }
747                                                  }
748                                                  }
749                                                  }
750                                                  }
751                                                  }
752                                                  }
753                                                  }
754                                                  }
755                                                  }
756                                                  }
757                                                  }
758                                                  }
759                                                  }
760                                                  }
761                                                  }
762                                                  }
763                                                  }
764                                                  }
765                                                  }
766                                                  }
767                                                  }
768                                                  }
769                                                  }
770                                                  }
771                                                  }
772                                                  }
773                                                  }
774                                                  }
775                                                  }
776                                                  }
777                                                  }
778                                                  }
779                                                  }
780                                                  }
781                                                  }
782                                                  }
783                                                  }
784                                                  }
785                                                  }
786                                                  }
787                                                  }
788                                                  }
789                                                  }
790                                                  }
791                                                  }
792                                                  }
793                                                  }
794                                                  }
795                                                  }
796                                                  }
797                                                  }
798                                                  }
799                                                  }
800                                                  }
801                                                  }
802                                                  }
803                                                  }
804                                                  }
805                                                  }
806                                                  }
807                                                  }
808                                                  }
809                                                  }
810                                                  }
811                                                  }
812                                                  }
813                                                  }
814                                                  }
815                                                  }
816                                                  }
817                                                  }
818                                                  }
819                                                  }
820                                                  }
821                                                  }
822                                                  }
823                                                  }
824                                                  }
825                                                  }
826                                                  }
827                                                  }
828                                                  }
829                                                  }
830                                                  }
831                                                  }
832                                                  }
833                                                  }
834                                                  }
835                                                  }
836                                                  }
837                                                  }
838                                                  }
839                                                  }
840                                                  }
841                                                  }
842                                                  }
843                                                  }
844                                                  }
845                                                  }
846                                                  }
847                                                  }
848                                                  }
849                                                  }
850                                                  }
851                                                  }
852                                                  }
853                                                  }
854                                                  }
855                                                  }
856                                                  }
857                                                  }
858                                                  }
859                                                  }
860                                                  }
861                                                  }
862                                                  }
863                                                  }
864                                                  }
865                                                  }
866                                                  }
867                                                  }
868                                                  }
869                                                  }
870                                                  }
871                                                  }
872                                                  }
873                                                  }
874                                                  }
875                                                  }
876                                                  }
877                                                  }
878                                                  }
879                                                  }
880                                                  }
881                                                  }
882                                                  }
883                                                  }
884                                                  }
885                                                  }
886                                                  }
887                                                  }
888                                                  }
889                                                  }
890                                                  }
891                                                  }
892                                                  }
893                                                  }
894                                                  }
895                                                  }
896                                                  }
897                                                  }
898                                                  }
899                                                  }
900                                                  }
901                                                  }
902                                                  }
903                                                  }
904                                                  }
905                                                  }
906                                                  }
907                                                  }
908                                                  }
909                                                  }
910                                                  }
911                                                  }
912                                                  }
913                                                  }
914                                                  }
915                                                  }
916                                                  }
917                                                  }
918                                                  }
919                                                  }
920                                                  }
921                                                  }
922                                                  }
923                                                  }
924                                                  }
925                                                  }
926                                                  }
927                                                  }
928                                                  }
929                                                  }
930                                                  }
931                                                  }
932                                                  }
933                                                  }
934                                                  }
935                                                  }
936                                                  }
937                                                  }
938                                                  }
939                                                  }
940                                                  }
941                                                  }
942                                                  }
943                                                  }
944                                                  }
945                                                  }
946                                                  }
947                                                  }
948                                                  }
949                                                  }
950                                                  }
951                                                  }
952                                                  }
953                                                  }
954                                                  }
955                                                  }
956                                                  }
957                                                  }
958                                                  }
959                                                  }
960                                                  }
961                                                  }
962                                                  }
963                                                  }
964                                                  }
965                                                  }
966                                                  }
967                                                  }
968                                                  }
969                                                  }
970                                                  }
971                                                  }
972                                                  }
973                                                  }
974                                                  }
975                                                  }
976                                                  }
977                                                  }
978                                                  }
979                                                  }
980                                                  }
981                                                  }
982                                                  }
983                                                  }
984                                                  }
985                                                  }
986                                                  }
987                                                  }
988                                                  }
989                                                  }
990                                                  }
991                                                  }
992                                                  }
993                                                  }
994                                                  }
995                                                  }
996                                                  }
997                                                  }
998                                                  }
999                                                  }
1000                                                  }

```



•Thank you !