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Vim Syntax File for MCNP Input Files

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This report provides a Vim syntax file for MCNP® input files. This file has been tested with Vim 8.2.1719 on macOS 10.15.7 and incorporates many of the input cards and keywords described in [1, Chapter 3].

For convenience, the MCNP syntax file is listed in Appendix A and also provided as an electronic attachment to this PDF. Brief instructions for how to retrieve and use it are also included in Appendix A.

An example MCNP input file using the attached Vim syntax file with a variety of color schemes is shown in Fig. 1.

A reasonable effort has been made to properly parse and highlight MCNP input files in a helpful manner. However, as deficiencies in the attached syntax file are identified they will be listed below until resolved. Known deficiencies include:

1. If the title card contains an MCNP card name or keyword, then title-card highlighting will be partially compromised.

References

[1] C. J. Werner, J. Armstrong, F. B. Brown, J. S. Bull, L. Casswell, L. J. Cox, D. Dixon, R. A. Forster, J. T. Goorley, H. G. Hughes, J. Favorite, R. Martz, S. G. Mashnik, M. E. Rising, C. J. Solomon, A. Sood, J. E. Sweezy, A. Zukaitis, C. Anderson, J. S. Elson, J. W. Durkee, R. C. Johns, G. W. McKinney, G. E. McMath, J. S. Hendricks, D. B. Pelowitz, R. E. Prael, T. E. Booth, M. R. James, M. L. Fensin, T. A. Wilcox, and B. C. Kiedrowski, "MCNP User's Manual, Code Version 6.2," Los Alamos National Laboratory, Los Alamos, NM, USA, Tech. Rep. LA-UR-17-29981, Oct. 2017. URL: http://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-17-29981

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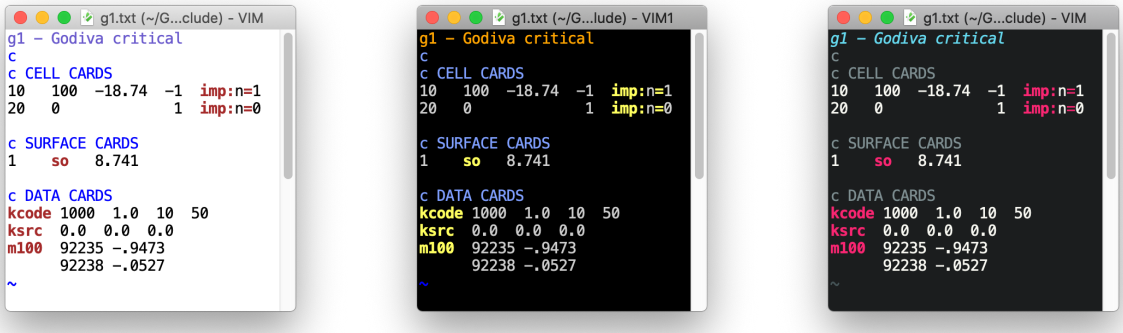
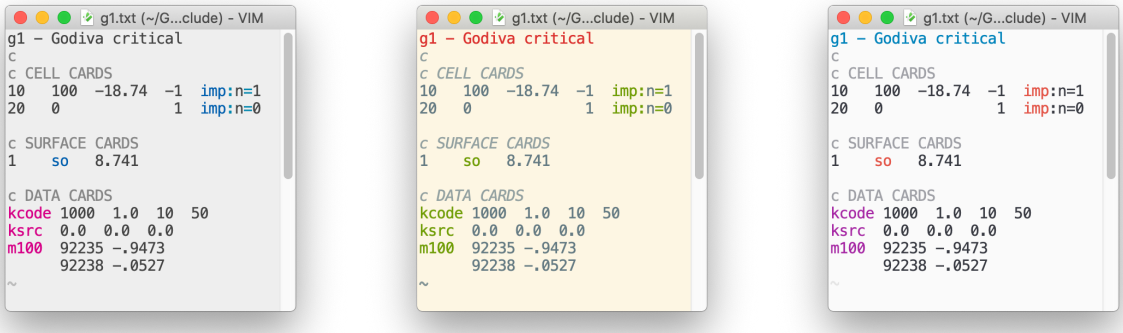
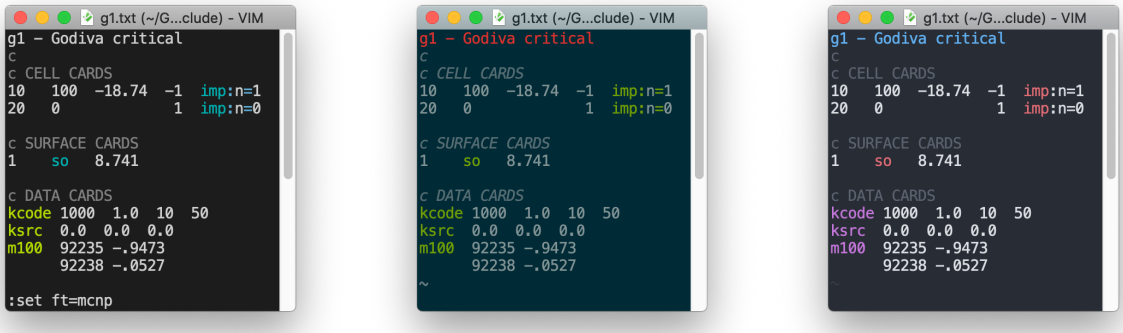


(a) Default (Light) (b) Torte (Dark) (c) Molokai (Dark)



(d) PaperColor (Light) (e) Solarized (Light) (f) onehalf (Light)



(g) PaperColor (Dark) (h) Solarized (Dark) (i) onehalf (Dark)

Figure 1: Example MCNP Input File with Syntax Highlighting

A Vim Syntax File for MCNP Input Files

Listing 1 provides a Vim syntax file for MCNP input files. This file can be used by naming it `mcnp.vim` and placing it in the `~/.vim/syntax` directory (on Linux and macOS) and enabled within Vim using the command `:set ft=mcnp`.

For convenience, the MCNP syntax file in Listing 1 is also provided as an electronic attachment to this PDF, which can be accessed using Adobe Acrobat through the menu path shown in Fig. 2.

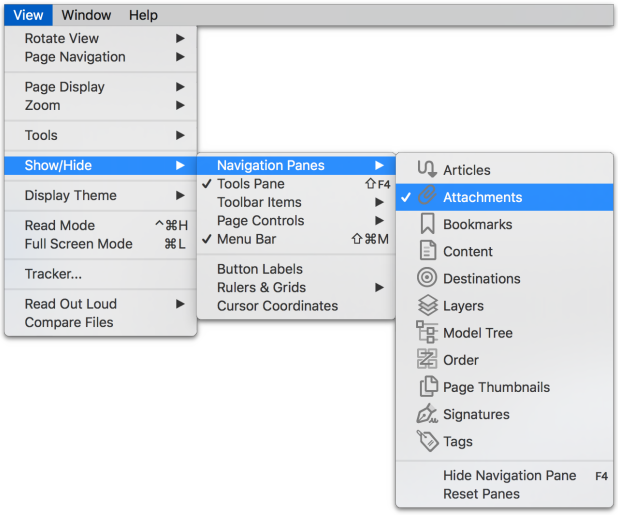


Figure 2: Adobe Acrobat Menu Path to Access PDF Attachments

Listing 1: Vim Syntax File for MCNP Input Files (mcnp.vim)

```
" Vim syntax file
" Language: MCNP Input File
" Version: 1.1.0
" Maintainer: Joel A. Kulesza <jkulesza@lanl.gov>
" Creator: Joel A. Kulesza <jkulesza@lanl.gov>
" Latest Revision: 01 December 2020
" First Revision: 05 June 2017
"
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" IMPLIED, OR ASSUMES ANY LEGAL LIABILITY OR RESPONSIBILITY FOR THE ACCURACY,
" COMPLETENESS, OR USEFULNESS OF ANY INFORMATION, APPARATUS, PRODUCT, OR PROCESS
```

```
" DISCLOSED, OR REPRESENTS THAT ITS USE WOULD NOT INFRINGE PRIVATELY OWNED
" RIGHTS.

if version < 600
  syntax clear
elseif exists("b:current_syntax")
  finish
endif

syntax case ignore

""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
" Preliminaries.
""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""

" Title card.
syn match mcnpTitle "\%1l.*$"

" Comments.
syn match mcnpComment "^\s\{0,4}c\s.*$"
syn match mcnpComment "^\s\{0,4}c$"
syn match mcnpComment "$.*$"

" Constants and operators.
syn match mcnpConstant "\d*j"
syn match mcnpOperator "="
syn match mcnpOperator "("
syn match mcnpOperator ")"

syn match mcnpOperator ":"
syn match mcnpVariable "d\d\+"
syn match mcnpOperator "#"

""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
" Cell keywords.
""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
syn keyword mcnpKeyword like but
syn match mcnpKeyword "mat"
syn match mcnpKeyword "rho"
syn match mcnpKeyword "imp"
syn match mcnpKeyword "vol"
syn match mcnpKeyword "pwt"
syn match mcnpKeyword "ext"
syn match mcnpKeyword "fcl"
syn match mcnpKeyword "wwn"
syn match mcnpKeyword "dxc"
syn match mcnpKeyword "nonu"
syn match mcnpKeyword "pd"
syn match mcnpKeyword "tmp"
syn match mcnpKeyword "trcl"
syn match mcnpKeyword "fill"
syn match mcnpKeyword "elpt"
syn match mcnpKeyword "cosy"
syn match mcnpKeyword "bflcl"
syn match mcnpKeyword "unc"
syn match mcnpKeyword " u"
syn match mcnpKeyword "lat"

syn match mcnpCard "^\s\{0,4}u"
syn match mcnpCard "^\s\{0,4}lat"
syn keyword mcnpCard uran

""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
" Surface keywords.
""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
```

```
syn keyword mcnpKeyword p px py pz so s sx sy sz cx cy cz kx ky kz sq gq tx ty tz xyzp
syn match mcnpKeyword "c\/x"
syn match mcnpKeyword "c\/y"
syn match mcnpKeyword "c\/z"
syn match mcnpKeyword "k\/x"
syn match mcnpKeyword "k\/y"
syn match mcnpKeyword "k\/z"
syn keyword mcnpKeyword box rpp sph rcc rhp hex rec trc ell wed arb

"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
" Data keywords.
"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""

" Geometry data cards.
syn match mcnpCard "^\s\{0,4}vol"
syn match mcnpCard "^\s\{0,4}area"
syn match mcnpCard "^\s\{0,4}\*\*trcl"
syn match mcnpCard "^\s\{0,4}\*\*tr\d\+"

" Mesh geometry data cards.
syn match mcnpCard "^\s\{0,4}mesh"
syn keyword mcnpKeyword geom ref origin axs vec imesh iints jmesh jints kmesh kints

syn match mcnpCard "^\s\{0,4}dm"
syn match mcnpCard "^\s\{0,4}dawwg"

syn match mcnpKeyword "embed"
syn match mcnpCard "^\s\{0,4}embed\d\+"
syn keyword mcnpKeyword background matcell meshgeo mgeoin meeout meein calc_vols filetype gmvfile length mcnpumfile overlap
syn keyword mcnpConstant yes no lnk3dnt abaqus mcnpum ascii binary exit entry average

syn match mcnpCard "^\s\{0,4}embee\d\+"
syn keyword mcnpKeyword energy time atom factor list mat mtype
syn keyword mcnpConstant flux isotopic population reaction source tracks

syn match mcnpCard "^\s\{0,4}embeb"
syn match mcnpCard "^\s\{0,4}embem"
syn match mcnpCard "^\s\{0,4}embtb"
syn match mcnpCard "^\s\{0,4}embtm"
syn match mcnpCard "^\s\{0,4}embde"
syn match mcnpCard "^\s\{0,4}embdf"

" Materials.
syn match mcnpCard "^\s\{0,4}m\d\+"
syn match mcnpCard "^\s\{0,4}mt\d\+"
syn match mcnpCard "^\s\{0,4}mx\d\+"
syn match mcnpCard "^\s\{0,4}xs\d\+"
syn match mcnpCard "^\s\{0,4}otfdb"
syn match mcnpCard "^\s\{0,4}totnu"
syn match mcnpCard "^\s\{0,4}nonu"
syn match mcnpCard "^\s\{0,4}awtab"
syn match mcnpCard "^\s\{0,4}void"
syn match mcnpCard "^\s\{0,4}mgopt"
syn match mcnpCard "^\s\{0,4}drxs"

" Thermal scattering data.
" LA-UR-17-20709
syn match mcnpConstant "al27.\d\+t"
syn match mcnpConstant "be.\d\+t"
syn match mcnpConstant "be-o.\d\+t"
syn match mcnpConstant "benz.\d\+t"
syn match mcnpConstant "beo.\d\+t"
syn match mcnpConstant "dortho.\d\+t"
syn match mcnpConstant "dpara.\d\+t"
syn match mcnpConstant "fe56.\d\+t"
```

```
syn match mcnpConstant "grph.\d\+t"
syn match mcnpConstant "h-zr.\d\+t"
syn match mcnpConstant "h/zr.\d\+t"
syn match mcnpConstant "hortho.\d\+t"
syn match mcnpConstant "hpara.\d\+t"
syn match mcnpConstant "hwtr.\d\+t"
syn match mcnpConstant "lmeth.\d\+t"
syn match mcnpConstant "lwtr.\d\+t"
syn match mcnpConstant "o-be.\d\+t"
syn match mcnpConstant "o/be.\d\+t"
syn match mcnpConstant "o2-u.\d\+t"
syn match mcnpConstant "o2-u.\d\+t"
syn match mcnpConstant "poly.\d\+t"
syn match mcnpConstant "si02.\d\+t"
syn match mcnpConstant "smeth.\d\+t"
syn match mcnpConstant "u-o2.\d\+t"
syn match mcnpConstant "u/o2.\d\+t"
syn match mcnpConstant "zr-h.\d\+t"
syn match mcnpConstant "zr/h.\d\+t"
" ENDF/B-VIII
syn match mcnpConstant "al-27.\d\+t"
syn match mcnpConstant "be-beo.\d\+t"
syn match mcnpConstant "be-met.\d\+t"
syn match mcnpConstant "benz.\d\+t"
syn match mcnpConstant "c-sic.\d\+t"
syn match mcnpConstant "d-d2o.\d\+t"
syn match mcnpConstant "fe-56.\d\+t"
syn match mcnpConstant "grph10.\d\+t"
syn match mcnpConstant "grph30.\d\+t"
syn match mcnpConstant "grph.\d\+t"
syn match mcnpConstant "h-h2o.\d\+t"
syn match mcnpConstant "h-ice.\d\+t"
syn match mcnpConstant "h-luci.\d\+t"
syn match mcnpConstant "h-poly.\d\+t"
syn match mcnpConstant "h-yh2.\d\+t"
syn match mcnpConstant "h-zrh.\d\+t"
syn match mcnpConstant "lmeth.\d\+t"
syn match mcnpConstant "n-un.\d\+t"
syn match mcnpConstant "o-beo.\d\+t"
syn match mcnpConstant "o-d2o.\d\+t"
syn match mcnpConstant "o-ice.\d\+t"
syn match mcnpConstant "orthoD.\d\+t"
syn match mcnpConstant "orthoH.\d\+t"
syn match mcnpConstant "o-uo2.\d\+t"
syn match mcnpConstant "paraD.\d\+t"
syn match mcnpConstant "paraH.\d\+t"
syn match mcnpConstant "sio2.\d\+t"
syn match mcnpConstant "si-sic.\d\+t"
syn match mcnpConstant "smeth.\d\+t"
syn match mcnpConstant "u-un.\d\+t"
syn match mcnpConstant "u-uo2.\d\+t"
syn match mcnpConstant "y-yh2.\d\+t"
syn match mcnpConstant "zr-zrh.\d\+t"

" Physics data cards.
syn match mcnpCard "^\s\{0,4}mode"
syn match mcnpCard "^\s\{0,4}phys"
syn match mcnpCard "^\s\{0,4}cut"
syn match mcnpCard "^\s\{0,4}tmp"
syn match mcnpCard "^\s\{0,4}thtme"
syn match mcnpCard "^\s\{0,4}mphys"
syn match mcnpCard "^\s\{0,4}unc"
syn match mcnpCard "^\s\{0,4}cosyp"
syn match mcnpCard "^\s\{0,4}cosy"
syn match mcnpKeyword "field"
```

```
syn match mcnpCard "^\s\{0,4}field"

syn match mcnpCard "^\s\{0,4}act"
syn keyword mcnpKeyword fission nonfiss dn dg thresh dnbias nap dneb dgeb pecut hlcut sample

syn match mcnpCard "^\s\{0,4}lca"
syn keyword mcnpKeyword ielas ipreq iexisa ichoic jcoul nexite npidk noact icem ilaq nevtype
syn match mcnpCard "^\s\{0,4}lcb"
syn match mcnpCard "^\s\{0,4}lcc"
syn match mcnpCard "^\s\{0,4}lea"
syn match mcnpCard "^\s\{0,4}leb"

syn match mcnpCard "^\s\{0,4}fmult"
syn keyword mcnpKeyword width sfyield watt method data shift

syn match mcnpCard "^\s\{0,4}tropt"
syn keyword mcnpKeyword mcscat eloss nreact nescat genxs

syn match mcnpCard "^\s\{0,4}bfld"
syn keyword mcnpKeyword vec mxdeflc maxstep axs ffedges refpnt

" Source specification.
syn match mcnpCard "^\s\{0,4}sdef"
syn keyword mcnpKeyword sur erg tme dir vec nrm pos rad ext axs ccc ara wgt tr eff par dat loc bem bap
syn match mcnpCard "^\s\{0,4}si\d\+"
syn match mcnpCard "^\s\{0,4}sp\d\+"
syn match mcnpCard "^\s\{0,4}sb\d\+"
syn match mcnpCard "^\s\{0,4}ds\d\+"
syn match mcnpCard "^\s\{0,4}sc\d\+"
syn match mcnpCard "^\s\{0,4}ssw"
syn match mcnpCard "^\s\{0,4}ssr"
syn match mcnpCard "^\s\{0,4}kcode"
syn match mcnpCard "^\s\{0,4}ksrc"
syn match mcnpCard "^\s\{0,4}hsrc"
syn match mcnpCard "^\s\{0,4}burn"

" Tallies.
syn match mcnpCard "^\s\{0,4}+\{0,1}\*\{0,1}f\d\+"
syn match mcnpCard "^\s\{0,4}fc\d\+"
syn match mcnpCard "^\s\{0,4}e\d\+"
syn match mcnpCard "^\s\{0,4}t\d\+"
syn match mcnpCard "^\s\{0,4}c\d\+"
syn match mcnpCard "^\s\{0,4}\*c\d\+"
syn match mcnpCard "^\s\{0,4}fq\d\+"
syn match mcnpCard "^\s\{0,4}fm\d\+"
syn match mcnpCard "^\s\{0,4}em\d\+"
syn match mcnpCard "^\s\{0,4}tm\d\+"
syn match mcnpCard "^\s\{0,4}cm\d\+"
syn match mcnpCard "^\s\{0,4}cf\d\+"
syn match mcnpCard "^\s\{0,4}sf\d\+"
syn match mcnpCard "^\s\{0,4}fs\d\+"
syn match mcnpCard "^\s\{0,4}sd\d\+"
syn match mcnpCard "^\s\{0,4}fu\d\+"
syn match mcnpCard "^\s\{0,4}tf\d\+"

syn match mcnpCard "^\s\{0,4}cm\d\+"
syn match mcnpCard "^\s\{0,4}fic\d\+"
syn match mcnpCard "^\s\{0,4}fip\d\+"
syn match mcnpCard "^\s\{0,4}fir\d\+"

syn match mcnpCard "^\s\{0,4}d[ef]\s\+"
syn match mcnpCard "^\s\{0,4}d[ef]\d\+"
syn match mcnpCard "^\s\{0,4}d[ef]\d\+"
syn keyword mcnpKeyword iu fac ic
syn keyword mcnpConstant log lin
```

```
287
288 " Special tally treatments.
289 syn match mcnpCard "^\s\{0,4}ft\d\+"
290 syn keyword mcnpCard frv geb tmc inc icd scx scd elc ptt phl cap res tag let roc pds fft com
291
292 " Perturbation and sensitivity cards.
293 syn match mcnpCard "^\s\{0,4}pert\d\+"
294 syn keyword mcnpKeyword cell mat rho method erg rxn
295
296 syn match mcnpCard "^\s\{0,4}kpert\d\+"
297 syn keyword mcnpKeyword cell mat rho iso rxn erg linear
298
299 syn match mcnpCard "^\s\{0,4}ksen\d\+"
300 syn keyword mcnpKeyword iso rxn mt erg ein legendre cos constrain
301
302 " TMesh.
303 syn match mcnpKeyword "tmesh"
304 syn match mcnpCard "^\s\{0,4}tmesh"
305 syn match mcnpCard "^\s\{0,4}rmesh\d\+"
306 syn match mcnpCard "^\s\{0,4}cmesh\d\+"
307 syn match mcnpCard "^\s\{0,4}smesh\d\+"
308 syn match mcnpCard "^\s\{0,4}cor[abc]\d\+"
309 syn match mcnpCard "^\s\{0,4}ergsh"
310 syn match mcnpCard "^\s\{0,4}mshmf\d\+"
311 syn match mcnpCard "^\s\{0,4}endmd"
312 syn keyword mcnpKeyword traks flux dose popul pedep mfact trans
313 syn keyword mcnpKeyword total recol tlest edlct
314 syn match mcnpKeyword "de\/dx"
315
316 " FMesh.
317 syn match mcnpCard "^\s\{0,4}\*\{0,1}fmesh\d\+"
318 syn keyword mcnpKeyword geom origin axs vec
319 syn keyword mcnpKeyword imesh iints jmesh jints kmesh kints emesh eints enorm tints tnorm
320 syn keyword mcnpKeyword out tr inc type kclear
321 syn keyword mcnpConstant xyz rzt col cf ij ik jk none
322
323 " Variance-reduction cards.
324 syn match mcnpCard "^\s\{0,4}imp"
325 syn match mcnpCard "^\s\{0,4}var"
326 syn match mcnpCard "^\s\{0,4}wwe"
327 syn match mcnpCard "^\s\{0,4}wwt"
328 syn match mcnpCard "^\s\{0,4}wwn\d\+"
329 syn match mcnpCard "^\s\{0,4}wwp"
330 syn match mcnpCard "^\s\{0,4}wwg"
331 syn match mcnpCard "^\s\{0,4}wwge"
332 syn match mcnpCard "^\s\{0,4}wwgt"
333 syn match mcnpCard "^\s\{0,4}esplt"
334 syn match mcnpCard "^\s\{0,4}tsplt"
335 syn match mcnpCard "^\s\{0,4}ext"
336 syn match mcnpCard "^\s\{0,4}vect\s\+v"
337 syn match mcnpCard "^\s\{0,4}fcl"
338 syn match mcnpCard "^\s\{0,4}dxt"
339 syn match mcnpCard "^\s\{0,4}dd\d*"
340 syn match mcnpCard "^\s\{0,4}pd\d\+"
341 syn match mcnpCard "^\s\{0,4}dxc\d\+"
342 syn match mcnpCard "^\s\{0,4}bbrem"
343 syn match mcnpCard "^\s\{0,4}pikmt"
344 syn match mcnpCard "^\s\{0,4}spabi"
345 syn match mcnpCard "^\s\{0,4}pwt"
346
347 " Problem-termination cards.
348 syn match mcnpKeyword "nps"
349 syn match mcnpCard "^\s\{0,4}nps"
350 syn match mcnpCard "^\s\{0,4}ctme"
351 syn match mcnpCard "^\s\{0,4}stop"
```

```
352
353 " Output-control cards.
354 syn match mcnpCard "^\s\{0,4}print"
355 syn match mcnpCard "^\s\{0,4}talnp"
356 syn match mcnpCard "^\s\{0,4}prdmp"
357
358 syn match mcnpCard "^\s\{0,4}ptrac"
359 syn keyword mcnpKeyword buffer file max meph write coinc event filter type cell surface tally value
360 syn keyword mcnpConstant asc bin all src bnk sur col ter
361 syn keyword mcnpConstant imp1 imp2 imp3 spare1 spare2 spare3 icl jsu idx ncp lev iii jjj kkk
362
363 syn match mcnpCard "^\s\{0,4}mplot"
364 syn match mcnpCard "^\s\{0,4}histp"
365
366 syn match mcnpCard "^\s\{0,4}read"
367 syn keyword mcnpKeyword file noecho echo decode encode
368
369 syn match mcnpCard "^\s\{0,4}rand"
370 syn keyword mcnpKeyword gen seed stride hist
371
372 syn match mcnpCard "^\s\{0,4}dbcn"
373 syn match mcnpCard "^\s\{0,4}lost"
374 syn match mcnpCard "^\s\{0,4}idum"
375 syn match mcnpCard "^\s\{0,4}rdum"
376 syn match mcnpCard "^\s\{0,4}files"
377
378 " Other data cards.
379 syn match mcnpCard "^\s\{0,4}spdtl"
380 syn match mcnpCard "^\s\{0,4}notrn"
381
382 """"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
383 " Final actions.
384 """"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
385
386 hi link mcnpCard        Statement
387 hi link mcnpComment     Comment
388 hi link mcnpConstant    Constant
389 hi link mcnpKeyword     Keyword
390 hi link mcnpOperator    Operator
391 hi link mcnpTitle       Special
392 hi link mcnpVariable    Constant
393
394 let b:current_syntax = "mcnp"
```