

ChatScript System Variables and Engine-defined Concepts

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- Engine-defined Concepts
- System Variables
- Control over Input
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Engine-defined concepts

In addition to concepts defined in script files, the system automatically defines a bunch of dictionary-based sets as well as dynamically computed concept members.

| set | description |
|---------------|---------------------------------------|
| ~web_url | word is a web url |
| ~email_url | word is an email address |
| ~kindergarten | word learned early in life |
| ~grade1_2 | word learned in these grades |
| ~grade3_4 | word learned in these grades |

| set | description |
|-------------|---|
| ~grade_5-6 | word learned in these grades. Un- marked words are learned even later |
| ~utf8 | word has nonascii characters |
| ~daynumber | word could be a number of a day in a month |
| ~yearnumber | word could be the number of a recent year |
| ~dateinfo | phrase is month day year of some kind |
| ~kelvin | temperature marker |
| ~celcius | temperature marker |
| ~fahrenheit | temperature marker |

| set | description |
|----------------|-------------------------------|
| ~twitter_name | twitter user name |
| ~hashtag_label | twitter topic reference |

Interjections, “discourse acts”, and concept sets

Some words and phrases have interpretations based on whether they are at sentence start or not. E.g., *good day*, *mate* and *It is a good day* are different for *good day*.

Likewise sure and I am sure are different. Words that have a different meaning at the start of a sentence are commonly called interjections.

In ChatScript these are defined by the `livedata/interjections.txt` file. In addition, the file augments this concept with “discourse acts”, phrases that are like an interjection. All interjections and discourse acts map to concept sets, which come thru as the user input instead of what they wrote. For example yes and sure and of course are all treated as meaning the discourse act of agreement in the interjections file. So you don’t see yes, I will go coming out of the engine.

The interjections file will remap that to the sentence `~yes`, breaking off that into its own sentence, followed by I will go as a new sentence.

These generic interjections (which are open to author control via `interjections.txt`) are: `~yes,~no,~emomaybe,~emohello,~emogoodbye,~emohowzit,~emothanks,~emolaugh,~emohappy,~emosad,~emosurprise,~emomisunderstand,~emoskeptic,~emoignorance,~emobeg,~emobored,~emopain,~emoangry,~emocurse,~emodisgust,~emoprotest,~emoapology,~emomutual`

Because all interjections at the start of a sentence are broken off into their own sentence, this kind of pattern does not work:

```
u: (~yes _*)
```

You cannot capture the rest of the sentence here, because it will be part of the next sentence instead. This means interjections act somewhat differently from other concepts.

If you use a word in a pattern which may get remapped on input, the script compiler will issue a warning. Likely you should use the remapped name instead.

The following concepts are triggered by exactly repeating either the chatbot or oneself (to a repeat count of how often repeated). Repeats are within a re-

cency window of about 20 volleys. ~repeatme, ~repeatinput1, ~repeatinput2, ~repeatinput3, ~repeatinput4, ~repeatinput5, ~repeatinput6,

POS (Part of Speech) Tags

Words will have pos-tags attached, specifying both generic and specific tag attributes, eg., ~noun and ~noun_singular.

Generic Specifics

~noun, ~noun_singular, ~noun_plural, ~noun_proper_singular, ~noun_proper_plural, ~noun_gerund, ~noun_number, ~noun_infinitive, ~noun_omitted_adjective, ~verb, ~verb_present, ~verb_present_3ps, ~verb_infinitive, ~verb_present_participle, ~verb_past, ~verb_past_participle, ~aux_verb, ~aux_verb_present, ~aux_verb_past, ~aux_verb_future (~aux_verb_tenses), ~aux_be, ~aux_have, ~aux_do

Auxilliary verbs are segmented into normal ones and special ones. Normal ones give their tense directly. Special ones give their root word. The tense of the be/have/do verbs can be had via ~properties() and testing for verb tenses

~adjective, ~adjective_normal, ~adjective_number, ~adjective_noun, ~adjective_participle

Adjectives in comparative form will also have ~more_form or ~most_form. ~adverb, ~adverb_normal

Adverbs in comparative form will also have ~more_form or ~most_form. ~pronoun, ~pronoun_subject, ~pronoun_object, ~conjunction_bits, ~conjunction_coordinate, ~conjunction_subordinate, ~determiner_bits, ~determiner, ~pronoun_possessive, ~predeterminer, ~possessive (covers 'and 's at end of word), ~to_infinitive ("to" when used before a noun infinitive), ~preposition, ~particle (free-floating preposition tied to idiomatic verb), ~comma, ~quote (covers ' and " when not embedded in a word), ~paren (covers opening and closing parens), ~foreign_word (some unknown word), ~there_existential (the word there used existentially),

In addition to normal generic kinds of pos tags, words which are serving a pos-tag role different from their putative word type are marked as members of the major tag they act as part of. E.g,

~noun_gerund – verb used as a ~noun ~noun_infinitive – verb used as a ~noun ~noun_omitted_adjective – an adjective used as a collective noun (eg the beautiful are kind)

~adjectival_noun (noun used as adjective like bank "bank teller") ~adjective_participle (verb participle used as an adjective)

For `~noun_gerund` in *I like swimming* the verb gerund *swimming* is treated as a noun (hence called noun-gerund) but retains verb sense when matching keywords tagged with part-of-speech (i.e., it would match `swim~v` as well as `swim~n`).

`~number` is not a part of speech, but is comprised of `~noun_number` (a normal number value like *17* or *seventeen*) and `~adjective_number` (also a normal numeral value and also `~placenum`) like first.

To can be a preposition or it can be special. When used in the infinitive phrase To go, it is marked `~to_infinitive` and is followed by `~noun_infinitive`.

`~verb_infinitive` refers to a match on the infinitive form of the verb (I hear John sing or I will sing).

`~There_existential` refers to the use of where not involving location, meaning the existence of, as in There is no future.

`~Particle` refers to a preposition piece of a compound verb idiom which allows being separated from the verb. If you say *I will call off the meeting*, `call_off` is the composite verb and is a single token. But if you split it as in *I will call the meeting off*, then there are two tokens. The original form of the verb will be `call` and the canonical form of the verb will be `call_off`, while the free-standing off will be labeled `~particle`.

`~verb_present` will be used for normal present verbs not in third person singular like I walk and `~verb_present_3ps` will be used for things like he walks

`~possessive` refers to 's and ' that indicate possession, while possessive pronouns get their own labeling `~pronoun_possessive`.

`~pronoun_subject` is a pronoun used as a subject (like he) while `pronoun_object` refers to objective form like (him)

Individual words serve roles in the parse of a sentence, which are retrievable. These include:

`~mainsubject`, `~mainverb`, `~mainindirect`, `~maindirect`, `~subject2`, `~verb2`, `~indirectobject2`, `~object2`, `~subject_complement` – (adjective object of sentence involving linking verb), `~object_complement` – (2ndary noun or infinitive verb filling modifying mainobject or object2), `~conjunct_noun`, `~conjunct_verb`, `~conjunct_adjective`, `~conjunct_adverb`, `~conjunct_phrase`, `~conjunct_clause`, `~conjunct_sentence`, `~postnominalAdjective` – adjective occurring AFTER the noun it modified, `~reflexive` – (reflexive pronouns), `~not`, `~address` – noun used as addressee of sentence, `~appositive` – noun restating and modifying prior noun, `~absolutephrase` – special phrase describing whole sentence, `~omittedtimeprep` – modified time word used as phrase but lacking preposition (Next tuesday I will go), `~phrase` – a prepositional phrase start (except, `~clause` – a subordinate clause start, `~verbal` – a verb phrase.

System Variables

The system has some predefined variables which you can generally test and use but not normally assign to. These all begin with `%`. Ones that are reasonable to set are written in bold underline. Boolean values are always 1 or null on returns. 1 or 0 if you are setting them.

Date & Time & Numbers

| variable | description |
|-------------------------------|--|
| <code>%date</code> | one or two digit day of the month |
| <code>%day</code> | Sunday, etc |
| <code>%daynumber</code> | 0-6 where 0 = Sunday |
| <code>%fulltime</code> | seconds representing the current time and date (Unix epoch time) |
| <code>%timenumber</code> | completely consistent full time info in numbers that you can do <code>_0 = ~burst(%timenumber)</code> to get <code>_0</code> =seconds (2digit) <code>_1</code> =minutes (2digit) <code>_2</code> =hours (2digit) <code>_3</code> =dayinweek(0-6 Sunday=0) <code>_4</code> =dateinmonth (1-31) <code>_5</code> =month(0-11 January=0) <code>_6</code> =year. You need to get it simultaneously if you want to do accurate things with current time, since retrieving <code>%hour</code> <code>%minute</code> separately allows time to change between calls |
| <code>%leapyear</code> | boolean if current year is a leap year |
| <code>%daylightsavings</code> | boolean if current within daylight savings |
| <code>%minute</code> | 0-59 |
| <code>%month</code> | 1-12 (January = 1) |
| <code>%monthname</code> | January, etc |
| <code>%second</code> | 0-59 |
| <code>%volleytime</code> | number of seconds of computation since volley input started |
| <code>%time</code> | hh:mm in military 24-hour time |
| <code>%week</code> | 1-5 (week of the month) |
| <code>%year</code> | e.g., 2011 |
| <code>%rand</code> | get a random number from 1 to 100 inclusive |

Time and date information are normally local, relative to the system clock of the machine CS is running on. See `$cs_utcoffset` for adjusting time based on relationship to utc (e.g your server is in Virginia and you are in Colorado).

User Input

| variable | description |
|---------------|--|
| %bot | current bot responding |
| %revisedinput | Boolean is current input from $\hat{\text{input}}$ not direct from user |
| %command | Boolean was the user input a command |
| %foreign | Boolean is bulk of the sen- tence com- posed of foreign words |
| %impliedyou | Boolean was the user input having you as implied subject |

| variable | description |
|-------------------|---|
| %input | the count of the number of volleys this user has made ever |
| %ip | ip address supplied |
| %length | the length in tokens of the current sentence |
| %more | Boolean is there another sen- tence after this |
| %morequest | Boolean is there a ? or ques- tion word in the pend- ing sentences |

| variable | description |
|-------------------|---|
| %originalinput | sentences user passed into volley, before ad- justed in any way except OOB data is stripped off |
| %originalsentence | current sen- tence after to- keniza- tion but before any adjustments |
| %parsed | Boolean was current input parsed successfully |
| %question | Boolean was the user input a ques- tion – same as ? in a pattern |

| variable | description |
|-----------------------|--|
| %quotation | Boolean is current input a quotation |
| %sentence | Boolean does it seem like a sen- tence (sub- ject/verb or command) |
| %tense | past , present, or future simple tense (present perfect is a past tense) |
| %user | user login name supplied |
| %userfirstline | value of %input that is at the start of this conver- sation start |

| variable | description |
|-------------------|--|
| %userinput | Boolean is the current input from the user (vs the chatbot) |
| %voice | active or passive on current input |

Chatbot Output

| variable | description |
|---------------------|---|
| %inputrejoin | inter- tag of any pend- ing rejoin- der for input or 0 if none |
| %lastoutput | the text of the last gener- ated re- sponse for the current volley |
| %lastquest | Boolean did last output end in a ? |

| variable | description |
|-------------------------|---|
| %outputrejoinder | number if system set a re- joinder for its current output or 0 |
| %response | number of re- sponses that have been gener- ated for this sentence |

System variables

| variable | description |
|------------------|---|
| %all | Boolean is the :all flag on? (:all to set) |
| %document | Boolean is :docu- ment running |
| %fact | Numeric value most recent fact id |

| variable | description |
|---------------------------|--|
| %freetext | kb of avail- able text space |
| %freedict | number of unused dictio- nary words |
| %freefact | number of unused facts |
| %maxmatchvariables | number of __match vari- ables, cur- rently 20 |
| %maxfactsets | highest number of @fact- sets, cur- rently 20 |
| %host | name of the current host ma- chine or “local” |
| %regression | Boolean is the regres- sion flag on |

| variable | description |
|----------------|---|
| %server | Boolean is the system running in server mode |
| %rule | get a tag to the current execut- ing rule. Can be used in place of a label |

| variable | description |
|--------------|--|
| %topic | name of the current “real” topic . if control is currently in a topic or called from a topic which is not system or nostay, then that is the topic. Otherwise the most recent pending topic is found |
| %actualtopic | literally the current topic being processed (system or not) |

| variable | description |
|----------------------|---|
| %trace | Numeric value of the trace flag (:trace to set) |
| %httpresponse | return code of most recent ^jsonopen call |
| %pid | Linux process id or 0 for other systems |

Build data+

| variable | description |
|-----------------|-------------------------------------|
| %dict | date/time the dictionary was built |
| %engine | date/time the engine was compiled |
| %os | os involved (linux windows mac ios) |
| %script | date/time build1 was compiled |
| %version | engine version number |

You actually can assign to any of them. This will override them and make them return what you tell them to and is a particularly BAD thing to do if this is running on a server since it affects all users (unless you reset the variable at the end of the volley. Assigning a period to a variable resets it). Typically one does this as a temporary assignment in a `#!` comment line to set up conditions for testing using `:verify`. Making them return a new value is NOT the same thing as making the engine have a different value. Unless the variable is marked as settable, setting a value affects only the value returned by a future call to the system variable. It does not change engine values the variable is meant to reflect.

Control Over Input

The system can do a number of standard processing on user input, including spell correction, proper-name merging, expanding contractions etc. This is managed by setting the user variable `$cs_token`.

The default one that comes with Harry is:

```
$cs_token = #DO_INTERJECTION_SPLITTING |  
            #DO_SUBSTITUTE_SYSTEM |  
            #DO_NUMBER_MERGE |  
            #DO_PROPERNAME_MERGE |  
            #DO_SPELLCHECK |  
            #DO_PARSE
```

The `#` signals a named constant from the `dictionarySystem.h` file. One can set the following:

These enable various LIVEDATA files to perform substitutions on input:

| flag | description |
|------------------------------|---|
| <code>DO_ESSENTIALS</code> | ENABLES LIVE- DATA/systemessentials which mostly strips off trailing punctu- ation and sets corre- spond- ing flags instead |
| <code>DO_SUBSTITUTES</code> | ENABLES LIVEDATA/substitutes |
| <code>DO_CONTRACTIONS</code> | ENABLES LIVE- DATA/contractions, expand- ing contractions |

| flag | description |
|----------------------|--|
| DO_INTERJECTIONS | <p>LIVE- DATA/interjections, chang- ing phrases to interjections</p> |
| DO_BRITISH | <p>US form LIVE- DATA/british, re- spelling brit words to American</p> |
| DO_SPELLING | <p>US forms the LIVE- DATA/spelling file (man- ual spell correction)</p> |
| DO_TEXTING | <p>US forms the LIVE- DATA/texting file (expand texting notation)</p> |
| DO_SUBSTITUTE_SYSTEM | <p>LIVE- DATA file expansions</p> |

| flag | description |
|---------------------------|---|
| DO_INTERJECTION_SPLITTING | off leading interjec- tions into own sentence |
| DO_NUMBER_MERGE | multi- ple word num- bers into one <i>(four</i> <i>and</i> <i>twenty)</i> |
| DO_PROPERNAME_MERGE | multi- ple proper name into one <i>(_George</i> <i>Harrison-</i> <i>)</i> |
| DO_DATE_MERGE | month day and/or year se- quences <i>(Jan-</i> <i>uary 2,</i> <i>1993)</i> |

If any of the above items affect the input, they will be echoed as values into %tokenFlags so you can detect they happened. The next changes do not echo into %tokenFlags and relate to grammar of input:

| flag | description |
|-----------------------|---|
| DO_POSTAG | How pos- tagging (labels like ~noun ~verb become marked) |
| DO_PARSE | How parser (labels for word roles like ~main_subject) |
| DO_CONDITIONAL_POSTAG | How pos- tagging only if all words are known. Avoids wasting time on foreign sen- tences in particular |
| NO_ERASE | Where a substi- tution would delete a word entirely as junk, don't |

| flag | description |
|----------------|---|
| DO_SPLIT | after all other input tokenization and adjustments except number merge, and separates words that have been conjoined either because the dictionary has them (<i>credit_card</i>) or because they were merged by proper name merging, or by substitution. The result is only words without |
| DO_UNDERSCORES | under-scores (excluding number words like <i>five_thousand_and_four</i>) |

| flag | description |
|-------------------------------------|--|
| MARK_UPPER MARK_LOWER | word is considered a proper name in CS and is marked as an upper case word, this will force it to perform any markings for its lower case form as well. Sometimes users type stuff in upper case that really should be lower |

Normally the system tries to outguess the user, who cannot be trusted to use correct punctuation or casing or spelling. These block that:

| flag | description |
|----------------------------|---|
| STRICT_CASING | for 1st word of a sentence, assume user uses correct casing on words |
| NO_INFERENCE_QUESTION_MARK | system will not try to set the QUESTION-MARK flag if the user didn't input a ? and the structure of the input looks like a question |
| DO_SPELL_CHECK | internal spell checking |

| flag | description |
|-----------------|---|
| ONLY_UPPERCASE | input (except “I”) to be lower case, refuse to recognize upper-case forms of anything |
| NO_IMPERATIVE | |
| NO_WITHIN | |
| NO_SENTENCE_END | |

Normally the tokenizer breaks apart some kinds of sentences into two. These prevent that:

| flag | description |
|------------------|---|
| NO_COLON_END | break apart a sentence after a colon |
| NO_SEMICOLON_END | break apart a sentence after a semi-colon |

| flag | description |
|-------------|--|
| LEAVE_QUOTE | <p>If the input is found withing " " it will become a single token exactly as it is seen. W/o Leave_Quote, it is converted into a word without quotes and using underscores instead of spaces. So "My Fair Lady" becomes My_Fair_Lady, which would match a movie title if you had one, unlike <i>My Fair Lady</i> becoming the result- 266 token and unrecognized</p> |

| flag | description |
|------|-------------|
|------|-------------|

Note, you can change `$cs_token` on the fly and force input to be reanalyzed via `^retry(SENTENCE)`. I do this when I detect the user is trying to give his name, and many foreign names might be spell-corrected into something wrong and the user is unlikely to misspell his own name. Just remember to reset `$cs_token` back to normal after you are done. Here is one such way, assuming `$stdtoken` is set to your normal tokenflags in your bot definition outputmacro:

```
#! my name is Rogr
s: (name is _*)

    if ($cs_token == $stdtoken)
    {
        $cs_token = #DO_INTERJECTION_SPLITTING |
                    #DO_SUBSTITUTE_SYSTEM | #DO_NUMBER_MERGE |
                    #DO_PARSE
        retry(SENTENCE)
    }
    _0 is the name.
    $cs_token = $stdtoken
```

If you type *my name is Rogr* into a topic with this, the original input is spell-corrected to *my name is Roger*, but this will change the `$cs_token` over to one without spell correction and redo the sentence, which will now come back with *my name is Rogr* and be echoed correctly, and `$cs_token` reset. That's assuming nothing else would run differently and trap the response elsewhere. If you were worried about that, it would be possible for the script to save where it is using `^getrule(tag)` and modify your control script to return immediate control to here after input processing if you had changed `$cs_token`.

Private Substitutions

While in general, substitutions are defined in the LIVEDATA folder, you can define private substitutions for your specific bot using the scripting language. You can say

```
replace: xxx yyyyy
```

which defines a substitution just like a livedata substitution file. It actually creates a substitution file called `private0.txt` or `private1.txt` in your TOPIC folder. Even then, those substitutions will not be enacted unless you explicitly add to the `$cs_token` value `#DO_PRIVATE`, eg

```
$cs_token = #DO_INTERJECTION_SPLITTING |
            #DO_SUBSTITUTE_SYSTEM |
```

```
#DO_NUMBER_MERGE |
#DO_PROPERNAME_MERGE |
#DO_SPELLCHECK |
#DO_PARSE |
#DO_PRIVATE
```

Similarly while canonical values of words can be defined in `LIVEDATA/SYSTEM/canonical.txt`, you can define private canonical values for your bots by using the scripting language. You can say:

```
canon: oh 0 faster fast
```

which defines new canonical values for things and creates a file `canon0.txt` or `canon1.txt` in your `TOPIC` folder. If you want to set a canonical pair from a table during compilation, you can use a function to do the same thing (but only 1 pair at a time).

```
^canon(word canonicalform)
```

Interchange Variables

The following variables can be defined in a script and the engine will react to their contents.

| interchange variable | description |
|-------------------------|--|
| <code>\$cs_token</code> | described exten- sively above |

| interchange variable | description |
|----------------------------|---|
| <code>\$cs_response</code> | controls auto- matic han- dling of outputs to user. By default it consists of <code>\$cs_response</code> = <code>#Response_upperstart</code> <code>#response_removespacebeforecomma</code> <code>#response_alterunderscores</code> <code>#response_remove tilde</code> If you want none of theses, use <code>\$cs_response</code> = 0 (all flags turned off). See <code>^print</code> for expla- nation of flags. <code>#response_upperstart</code> – makes the first letter of an output sen- tence capital- ized, <code>#Response_removespacebeforecomma</code> – does the obvious, <code>#Response_alterunderscores</code> - con- verts |

| interchange variable | description |
|-------------------------------|---|
| <code>\$cs_jsontimeout</code> | seconds before JsonOpen declares a timeout failure. If unspecified the default is 300 |
| <code>\$cs_crashmsg</code> | in server mode, what to say if the server crashes and we return a message to the user. By default the message is <i>Hey, sorry. I forgot what I was thinking about.</i> |
| <code>\$cs_abstract</code> | used with :abstract |

| interchange variable | description |
|-----------------------------|--|
| <code>\$cs_looplimit</code> | loop() defaults to 1000 itera- tions before stop- ping. You can change this default with this |

| interchange variable | description |
|-------------------------|--|
| <code>\$cs_trace</code> | if this variable is defined, then whenever the user's volley is finished, the value of this variable is set to that of <code>:trace</code> and <code>:trace</code> is cleared to 0, but when the user is read back in, the <code>:trace</code> is set to this value. For a server, this means you can perform tracing on a user w/o making all user transactions dump trace data |

| interchange variable | description |
|---------------------------------------|--|
| <code>\$cs_control_pre</code> | name of topic to run in gambit mode on pre-pass, set by author. Runs before any sentences of the input volley are analyzed. Good for setting up initial values |
| <code>\$cs_usermessagelimitmax</code> | number of message pairs (user input & bot output) saved in topic file |

| interchange variable | description |
|-------------------------------|---|
| <code>\$cs_externaltag</code> | name of a topic to use to replace existing internal English pos- parser. See bottom of ChatScript PosParser manual for details |

| interchange variable | description |
|---------------------------|---|
| <code>\$cs_prepass</code> | name of a topic to run in responder mode on main volleys, which runs before <code>\$cs_control_main</code> and after all of the above and pos-parsing is done. Used to amend preparation data coming from the engine. You can use it to add your own spin on input processing before going to your main control. I use it to, for example, label commands as questions, stan- |

| interchange variable | description |
|--------------------------------|---|
| <code>\$cs_control_main</code> | name of topic to run in responder mode on main volleys, set by author |
| <code>\$cs_control_post</code> | name of topic to run in gambit mode on post-pass, set by author |
| <code>\$botprompt</code> | message for console window to label bot output |
| <code>\$userprompt</code> | message for console window to label user input line |
| <code>\$cs_crashmsg</code> | message to use if a server crash occurs |

| interchange variable | description |
|----------------------------|---|
| <code>\$cs_language</code> | if spanish, will adjust spell check- ing for spanish colloquial |
| <code>\$cs_token</code> | bits control- ling how the tok- enizer works. By default when null, you get all bits as- sumed on. The possible values are in src/dictionarySystem.h (hunt for \$token) and you put a # in front of them to gen- erate that named nu- meric constant |

| interchange variable | description |
|----------------------------|--|
| <code>\$cs_abstract</code> | topic used by :ab- stract to display facts if you want them displayed |
| <code>\$cs_prepass</code> | topic used be- tween parsing and running user control script. Useful to sup- plement parsing, setting the ques- tion value, and revising input idioms |

| interchange variable | description |
|------------------------|--|
| \$cs_wildcardseparator | when a match variable covers multiple words, what should separate them by default it's a space, but underscore is handy too. Initial system character is space, creating fidelity with what was typed. Useful if _ can be recognized in input (web addresses). Changing to _ is consistent with multi-word representation and keyword recogni- |

| interchange variable | description |
|---------------------------------|---|
| <code>\$cs_userfactlimit</code> | how many of the most recent permanent facts created by the script in response to user inputs are kept for each user. Std default is 100 |
| <code>\$cs_response</code> | controls some characteristics of how responses are formatted |
| <code>\$cs_randIndex</code> | the random seed for this volley |

| interchange variable | description |
|----------------------|--|
| \$cs_utcoffset | <p>if defined, then %time returns current utc time + time-zone offset. The offset is usually a simple number, meaning hours, and can have + or - in front of it. It can also be a normal time reference like 02:30 which means plus 2 hours and 30 minutes beyond utc, or - 01:30:20 which means 1 hour, 30 minutes, and 20 seconds before utc (as if anyone would</p> |

| interchange variable | description |
|--------------------------------|--|
| <code>\$\$db_error</code> | error mes- sage from a post- gres failure \$\$find- text_start - ^find- text return the end nor- mally, this is where it puts the start |
| <code>\$\$tcpopen_error</code> | error mes- sage from a tcpopen error |
| <code>\$\$document</code> | name of the doc- ument being read in docu- ment mode |
| <code>\$cs_randindex</code> | current value of the random genera- tor value |

| interchange variable | description |
|----------------------|--|
| \$cs_bot | name of the bot cur- rently in use |
| \$cs_login | login name of the user |