ProductKeyGenerator Wiki

Introduction:

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ProductKeyGenerator uses the $RANDOM variable built into Bash in a sequence until it generates appropriate software license keys based on a unique algorithm. It may be used in part or entirely by an organization as a least limiting method of DRM to verify a legal purchase of their software. The same algorithms may also be used to check the validity of a license key.

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Manual:

[SYNOPSIS]

```
./keygen.sh ARG1 ARG2 ARG3
```

Minimal Usage:

```
./keygen.sh ARG1
```

Examples:

```
./keygen.sh cd
        Generate a single CD key

./keygen.sh oem --debug
        Show the 4-algorithm step by step process of
        generating an OEM key

./keygen.sh oem 2**5 --silent
        Calculate (2**5 = 32); generate 32 keys withouts
        enumeration

./keygen.sh cd 5 --silent > keys.txt
        Generate 5 keys silently (only output the key).
        Then save the output in the file keys.txt
```

[ARG 1 PARAMETERS: TYPES OF KEYS]

```
oem
        Generate Product ID (OEM) Keys.

cd
        Generate CD Keys.

-v, --validate
        Validate a CD/OEM key provided as an argument.

-h, --help
        Show this help and exit 0.

-l, --license
        Display license
```

[ARG 2 PARAMETER: NUMBER OF KEYS] (optional)

```
This parameter may be omitted entirely, in which case only 1
key will be generated!

N ∈ (1, 2**63-1)
```

Enter any integer between 1 and 9223372036854775807 representing how many keys to be generated. A Bash integer calculation may also be entered!

KEY
If -v is used, you must enter an OEM or CD key to validate.

-d, --debug
Useful for develpers, or for learning how the program works

[ARG 3 PARAMETER: POWER TOOLS] (optional)

This can only be used if an integer N was also given!

-s, --silent
Only output license keys, no enumeration

-c, --check
Uses internal validation algorithm to confirm the newly generated keys are valid. (Essentially the generate algorithms reverse-engineered). This process is certain to be slower, however can detect internal script errors.

[EXIT CODES]

0 : Success

Argument Errors:
1 : Argument 1 invalid: product type / help / version
2 : Argument 2 invalid: N number of keys / debug
3 : Too many arguments given
4 : Validator: invalid format
5 : Validator: invalid Key

Internal Errors (please report these):
6 : Validator: internal error!
7 : Internal check algorithm failed!
8 : End of script!
The script is set to exit 0 after completion of generation. If the script reaches the end (outside of main() function) the script will exit 8 indicating an error has occured!

Project Requirements:

The four essential freedoms of software (according to the Free Software Foundation)

0. The freedom to run the program as you wish, for any purpose.
1. The freedom to study how the program works, and change it so it does your computing as you wish. Access to the source code is a precondition for this.
2. The freedom to redistribute copies so you can help others.
3. The freedom to distribute copies of your modified versions to others. By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.

Thanks to the chosen license (GPL3+), as well as the version control it is maintained by (git), this program grants others the right to use, modify, derive, and share this program as they see fit.

This program is built with the intent for the user to be able to, on demand;

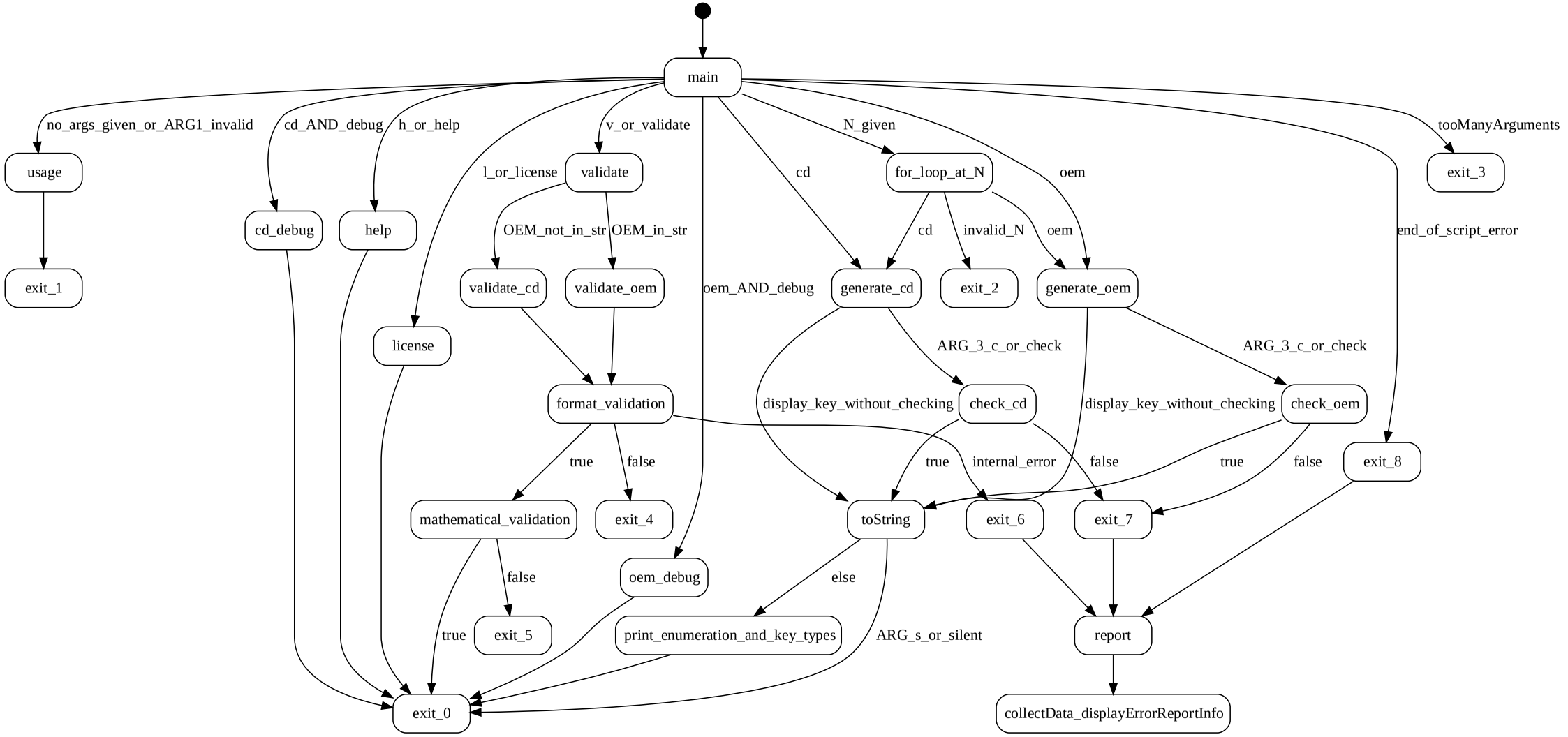
- ✔ Generate a unique product key to be published on a CD (or other physical medium).
- ✔ Generate a unique product key to be included in hardware (OEM).
- ✔ Specify a cardinal number in the form of an integer (between 1 and 2^{63}-1) representing the number of keys to be generated.
- ✔ Request generation of only the keys, without any other text such as enumeration and key type.
- ✔ Save the generated output to a file with the name of the user's choosing
- ✔ Validate an OEM or CD key entered by the user;
- ✔ If an entered key is incorrect, the program must show which part(s) are invalid.

- ✔ Optionally have the program check each key it generates immediately after displaying it
- ✔ Display any internal errors that have occurred (to the limits of the internal error checking algorithms)
- ✔ Run generations in debug mode, showing the input and output of data within the algorithms

Architecture: Diagram

The following state diagram shows the essence of the logic behind the program. It is by no means conclusive, however it should give anyone interested in this program the idea of how it works. It shows the general routes through which data flows. Not every sector is a function, some are just major parts of the algorithms. In some cases, operations like loops and certain if statements are represented as their own branch, however in reality they exist in the main function for the sake of efficiency.

The state diagram was generated by Umple, a portable modelling language aimed at simplicity. The language allows for UML diagrams to be drawn, as well as modelling with many object-oriented programming languages. The code to recreate this exact model can be found in the git repository.


main
no_args_given_or_ARG1_invalid
cd_AND_debug
h_or_help
v_or_validate
l_or_license
cd
N_given
oem
oem_AND_debug
end_of_script_error
tooManyArguments
usage
cd_debug
help
validate
license
for_loop_at_N
generate_cd
generate_oem
exit_3
exit_1
OEM_not_in_str
OEM_in_str
cd
invalid_N
oem
validate_cd
validate_oem
exit_2
ARG_3_c_or_check
ARG_3_c_or_check
format_validation
display_key_without_checking
check_cd
display_key_without_checking
check_oem
exit_8
true
false
true
internal_error
false
true
false
mathematical_validation
exit_4
toString
exit_6
exit_7
false
else
oem_debug
true
exit_5
print_enumeration_and_key_types
ARG_s_or_silent
report
exit_0
collectData_displayErrorReportInfo

Architecture: Technical description of each function

Herein, the term “self-sufficient” means a function that does not require any input (as variables, arguments, or otherwise), or the presence of other functions from this program. In other words, it can be cut from the source code, and successfully run on its own.

Function	Description
`license()`	This is a self-sufficient function invoked by the `-l` and `--license` arguments. It prints a short form of GNU GPL 3+, in the format that the GNU Project recommends. This is the first function in the source file, as that is what GNU strongly advices; for the license to be immediately visible upon opening the source code.
`oem()`	This is a self-sufficient function which generates a single OEM key using a series of algorithms, and directs its output into a variable `$KEY`.
`oem_debug()`	This self-sufficient function is algorithmically identical to `oem()`, however it prints the values of all temporary variables during the process of generation of an OEM key. This is useful for detecting errors, as well as learning how the program works.
`cd()`	This is a self-sufficient function which generates a single CD key using a series of algorithms, and directs its output into a variable `$KEY`.
`cd_debug()`	This self-sufficient function is algorithmically identical to `cd()`, however it prints the values of all temporary variables during the process of generation of an CD key. This is useful for detecting errors, as well as learning how the program works.
`validate_oem()`	This function uses the same algorithm from `oem()` reverse engineered to validate a user inputted OEM key for correct format, as well as mathematical approval. This function is run only once upon user input, so efficiency is not a priority.
`check_oem()`	If the `-c` or `--check` arguments were given, this function will be called every time an OEM key is generated, to check if it is valid. It is similar to `validate_oem()`, however it only performs the mathematical validation, as performing a format validation would cause it to be about 11 times less efficient. Format errors have no need to be called when the key was generated by the program, and not given by the user.
`validate_cd()`	This function uses the same algorithm from `cd()` reverse engineered to

validate a user inputted OEM key for correct format, as well as mathematical approval.

`check_cd()` If the `-c` or `--check` arguments were given, this function will be called every time a CD key is generated, to check if it is valid. It is similar to `validate_cd()`, however it only performs the mathematical validation, as performing a format validation would cause it to be about 7 times less efficient. Format errors have no need to be called when the key was generated by the program, and not given by the user.

`zero_remover()` This function was added to aid the format validation algorithms of `validate_oem()` and `validate_cd()` due to BASH interpreting numbers like 067 as octal. Forcing BASH to interpret a variable as a decimal integer works only for variables that only contain digits, however both OEM and CD keys also contain dashes and letters.

`main()` This function is called after initialization of the script is complete. It is responsible for handling arguments; in that it will call the appropriate functions for which keys are requested, load loops when more than one key needs to be generated, and handle most of the exit codes. It is written in what might seem an inefficient style, however it is only run once in an instance, and is designed so as to make the other payload functions operate with minimal instructions.

`help()` This self-sufficient function displays the full help upon entering `-h` or `--help` as arguments.

`usage()` This self-sufficient functions displays short usage information upon starting the program with no arguments given.

`report()` This function prints error handling information when an internal error occurs. It lists the branch and version of the program, as well as the arguments used and an email to which an error can be sent.

Architecture: Patterns and Frameworks used

BASH is a scripting language written to be the primary shell of the GNU Project. GNU stands for GNU's Not Unix. This style of naming was used in the 1980's when groups would reverse engineer proprietary software, releasing it as free (libre) software, however not containing any original code. Unix had its own shell called sh (Bourne Shell), and therefore BASH stands for Bourne Again SHell. It is a required component of the GNU/Linux operating system, and many Unix derivatives such as MacOS also use BASH. The language is intended to be a conformant of the IEEE POSIX Shell (IEEE Working Group 1003.2). POSIX is a standard maintained by IEEE to unify system formats of the hundreds of Unix derivatives and clones.

This program has no dependencies other than BASH itself. It is therefore entirely POSIX compliant. Older versions of the script utilized features like `expr` for handling mathematical and logical expressions, which are part of GNU Coreutils, however to allow it to run on platforms such as MacOS, these instructions were instead translated to ones built into BASH. To maintain this strict compatibility, the program rejects all usage of return values larger than 8 bits (the C equivalent of the char data type) and even floating point integers.

BASH's single dependency is the GNU C Library version 6 (glibc), however any Unix based system is certain to have a C library at the lowest ring of its userland.

`printf` is used for displaying any text to standard output (stdout), rather than BASH's own `echo`. This makes it easier to port this program to other C-style languages such as Python or Java without having to rewrite the scripts to display messages as intended.

Architecture: Modifying the system and variable meanings

Nearly exhaustive list of variables used by the script. It should be noted that BASH cannot directly return variables larger than a single 8-bit char (enumerated 0-255), and functions cannot take variables as input. Therefore, the majority of these variables are global to the script.

Variable	Use
`VERSION`	Declared version of program
`EMAIL`	Email used in documentation and error reports
`ARG1`	Represents first argument of standard input
`ARG2`	Second argument of standard input
`ARG3`	Third argument of standard input
`ARG4`	Fourth argument of standard input (if not empty, error 4 occurs)
`CN`	Standard format for displaying strings
`CB`	Bold format for displaying strings
`i`	Used only by main() in for loops for multi key generation
`D`	Day of year, used by OEM keys
`Y`	Year between 1995 and 2003, used by OEM
`a,b,c,d,e,f`	Six digit divisible by 7 segment
`r1,r2,r3,r4,r5`	Entirely random segment used by OEM
`KEY`	Holds the final key, for printing, or as input for check functions
`S`	3 digit segment from CD (cannot be 333, 444, ... , 999)
`a,b,c,d,e,f,g`	Seven digit divisible by 7 segment, g cannot be 0, 8, 9
`KEY_TYPE`	Variable always equals "OEM" or "CD"
`DEC`	Input/output variable for `zero_remover()`
`S1`	Fragmentary day of year used by `validate_oem()` and `check_oem()`
`S2`	Fragmentary year used by `validate_oem()` and `check_oem()`
`S3`	Six digit divisible by 7 segment used by `validate_oem()` and `check_oem()`
`S4`	Five digit random segment used by `validate_oem()` and `check_oem()`
`g`	Last digit of divisible by 7 segment (only used on OEM keys)
`exitcode`	Binary 3 digit, each digit represents the presence of different errors used only by `validate_cd()`. NOT USED FOR PROGRAM EXIT CODE

The layout of the program is structured in a way that creates clear boundaries between the various functions. This makes it easy to add new features. For example, a new key type besides OEM and CD can be added by writing a new function for its generation, and optionally a debug version, verify, and check. Thereafter, main() can be modified to recognize appropriate arguments to run those functions, and as long as its variables do not interfere with the ones listed above, it will work as a brand new feature. Only `main()` can exit 0 after successful completion of a task, however if a payload function detects an error, it may exit with a different code. No modifications to frameworks or other files outside of the script is necessary for adding or modifying the program. In fact, the General Public License encourages modification of the program!

Manual Testing

Provided in the file titled Manual Tests.html as well as below is an example of manual tests that should be conducted with every new version or modification of the program. They are HTML captures of the exact output running on BASH version 5.0.3. The file exists in the git repository.

ProductKeyGenerator Wiki

```
ninick@HP:~$ ./keygen.sh
./keygen.sh (Version 0.82), see CHANGELOG.html for more information!

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FITNESS FOR A PARTICULAR PURPOSE.

SYNOPSIS:       ./keygen.sh ARG1 ARG2 ARG3
Minimal Usage:  ./keygen.sh ARG1

[ARG 1 PARAMETERS: TYPES OF KEYS]

        oem     Generate Product ID (OEM) Keys.
        cd      Generate CD Keys.
        -v, --validate  Validate a CD/OEM key provided as an argument.
        -h, --help      Show this help and exit 0.
        -l, --license   Display license

[ARG 2 PARAMETER: NUMBER OF KEYS] (optional)
        This parameter may be omitted entirely, in which case only 1 key will be
generated!

        N ∈ (1, 2**63-1)
                Enter any integer between 1 and 9223372036854775807 (2**63 -1)
representing
                how many keys to be generated. A Bash integer calculation may
also be entered!

        KEY     If -v is used, you must enter an OEM or CD key to validate.

        -d, --debug     Useful for develpers, or to learn how the program works

[ARG 3 PARAMETER: POWER TOOLS] (optional)
        This can only be used if an integer N was also given!

        -s, --silent    Only output license keys, no enumeration
        -c, --check     Uses internal validation algorithm to confirm the newly
generated keys are
                        valid. (Essentially the algorithms reverse-engineered).
This process
                        is certain to be slower, however can detect internal
script errors.

Try ./keygen.sh --help for more information.
nick@HP:~$ ./keygen.sh oem
OEM Product ID #1:              03297-OEM-0158445-25643
nick@HP:~$ ./keygen.sh cd
CD Key #1:              695-1876266
nick@HP:~$ ./keygen.sh oem 5
OEM Product ID #1:              08402-OEM-0540337-24468
OEM Product ID #2:              12699-OEM-0809711-98003
OEM Product ID #3:              20699-OEM-0199094-51325
OEM Product ID #4:              26997-OEM-0854931-39920
OEM Product ID #5:              01295-OEM-0957516-87314
nick@HP:~$ ./keygen.sh cd 2**4
CD Key #1:              723-8854671
CD Key #2:              344-8437114
```

```
CD Key #3:              539-0952973
CD Key #4:              792-4104723
CD Key #5:              304-6431775
CD Key #6:              908-1342824
CD Key #7:              664-8605723
CD Key #8:              554-6189596
CD Key #9:              602-5996466
CD Key #10:             505-9326737
CD Key #11:             044-0637973
CD Key #12:             421-0839181
CD Key #13:             322-3083227
CD Key #14:             374-9879394
CD Key #15:             049-1719942
CD Key #16:             991-3101371
nick@HP:~$ ./keygen.sh -h
./keygen.sh (Version 0.82)

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This program uses the $RANDOM variable built into Bash in a sequence until it
generates appropriate software license keys based on a proprietary alogrithm.
It may be used in part or entirely by an organization as a method of DRM to
verify a legal purchase of their software. The same algorithms may also be used
to check the validity of a licence key.
See ./keygen.sh --help for more information.


[SYNOPSIS]
        ./keygen.sh ARG1 ARG2 ARG3

        Minimal Usage:
        ./keygen.sh ARG1

        Examples:
        ./keygen.sh cd
                Generate a single CD key

        ./keygen.sh oem --debug
                Show the 4-algorithm step by step process of generating an OEM
key

        ./keygen.sh oem 2**5 --silent
                Calculate (2**5 = 32); generate 32 keys without enumeration

        ./keygen.sh cd 5 --silent > keys.txt
                Generate 5 keys silently (only output the key).
                Then save the output in the file keys.txt


[ARG 1 PARAMETERS: TYPES OF KEYS]
        oem
                Generate Product ID (OEM) Keys.

        cd
                Generate CD Keys.

        -v, --validate
                Validate a CD/OEM key provided as an argument.
```

```
        -h, --help
                Show this help and exit 0.

        -l, --license
                Display license


[ARG 2 PARAMETER: NUMBER OF KEYS] (optional)
        This parameter may be omitted entirely, in which case only 1 key will be
generated!

        N ∈ (1, 2**63-1)
                Enter any integer between 1 and 9223372036854775807 representing
                how many keys to be generated. A Bash integer calculation may
also be entered!

        KEY
                If -v is used, you must enter an OEM or CD key to validate.

        -d, --debug
                Useful for develpers, or to learn how the program works


[ARG 3 PARAMETER: POWER TOOLS] (optional)
        This can only be used if an integer N was also given!

        -s, --silent
                Only output license keys, no enumeration

        -c, --check
                Uses internal validation algorithm to confirm the newly
generated
                keys are valid. (Essentially the generate algorithms reverse-
engineered).
                This process is certain to be slower, however can detect
internal script errors.


[EXIT CODES]
        0 : Success

        Argument Errors:
        1 : Argument 1 invalid: product type / help / version
        2 : Argument 2 invalid: N number of keys / debug
        3 : Too many arguments given
        4 : Validator: invalid format
        5 : Validator: invalid Key

        Internal Errors (please report these):
        6 : Validator: internal error!
        7 : Internal check algorithm failed!
        8 : End of script!
                The script is set to exit 0 after completion of generation. If
the script
                reaches the end (outside of main() function) the script will
exit 8
                indicating an error has occured!
```

```
nick@HP:~$ ./keygen.sh --help
./keygen.sh (Version 0.82)

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This program uses the $RANDOM variable built into Bash in a sequence until it
generates appropriate software license keys based on a proprietary alogrithm.
It may be used in part or entirely by an organization as a method of DRM to
verify a legal purchase of their software. The same algorithms may also be used
to check the validity of a licence key.
See ./keygen.sh --help for more information.


[SYNOPSIS]
        ./keygen.sh ARG1 ARG2 ARG3

        Minimal Usage:
        ./keygen.sh ARG1

        Examples:
        ./keygen.sh cd
                Generate a single CD key

        ./keygen.sh oem --debug
                Show the 4-algorithm step by step process of generating an OEM
key

        ./keygen.sh oem 2**5 --silent
                Calculate (2**5 = 32); generate 32 keys without enumeration

        ./keygen.sh cd 5 --silent > keys.txt
                Generate 5 keys silently (only output the key).
                Then save the output in the file keys.txt


[ARG 1 PARAMETERS: TYPES OF KEYS]
        oem
                Generate Product ID (OEM) Keys.

        cd
                Generate CD Keys.

        -v, --validate
                Validate a CD/OEM key provided as an argument.

        -h, --help
                Show this help and exit 0.

        -l, --license
                Display license


[ARG 2 PARAMETER: NUMBER OF KEYS] (optional)
        This parameter may be omitted entirely, in which case only 1 key will be
generated!

        N ∈ (1, 2**63-1)
```

```
                Enter any integer between 1 and 9223372036854775807 representing
                how many keys to be generated. A Bash integer calculation may
also be entered!

        KEY
                If -v is used, you must enter an OEM or CD key to validate.

        -d, --debug
                Useful for develpers, or to learn how the program works


[ARG 3 PARAMETER: POWER TOOLS] (optional)
        This can only be used if an integer N was also given!

        -s, --silent
                Only output license keys, no enumeration

        -c, --check
                Uses internal validation algorithm to confirm the newly
generated
                keys are valid. (Essentially the generate algorithms reverse-
engineered).
                This process is certain to be slower, however can detect
internal script errors.


[EXIT CODES]
        0 : Success

        Argument Errors:
        1 : Argument 1 invalid: product type / help / version
        2 : Argument 2 invalid: N number of keys / debug
        3 : Too many arguments given
        4 : Validator: invalid format
        5 : Validator: invalid Key

        Internal Errors (please report these):
        6 : Validator: internal error!
        7 : Internal check algorithm failed!
        8 : End of script!
                The script is set to exit 0 after completion of generation. If
the script
                reaches the end (outside of main() function) the script will
exit 8
                indicating an error has occured!

nick@HP:~$ ./keygen.sh -l
./keygen.sh (Version 0.82)
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This program uses the $RANDOM variable built into Bash in a sequence until it
generates appropriate software license keys based on a unique alogrithm.
It may be used in part or entirely by an organization as a method of DRM to
verify a legal purchase of their software. The same algorithms may also be used
to check the validity of a licence key.
See ./keygen.sh --help for more information.

        "GNU General Public License version 3 or later"
```

```
        This program is free software: you can redistribute it and/or modify
        it under the terms of the GNU General Public License as published by
        the Free Software Foundation, either version 3 of the License, or
        (at your option) any later version.

        This program is distributed in the hope that it will be useful,
        but WITHOUT ANY WARRANTY; without even the implied warranty of
        MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
        GNU General Public License for more details.

        You should have received a copy of the GNU General Public License
        along with this program.  If not, see <https://www.gnu.org/licenses/>.

nick@HP:~$ ./keygen.sh --license
./keygen.sh (Version 0.82)
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This program uses the $RANDOM variable built into Bash in a sequence until it
generates appropriate software license keys based on a unique alogrithm.
It may be used in part or entirely by an organization as a method of DRM to
verify a legal purchase of their software. The same algorithms may also be used
to check the validity of a licence key.
See ./keygen.sh --help for more information.

        "GNU General Public License version 3 or later"

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        the Free Software Foundation, either version 3 of the License, or
        (at your option) any later version.

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        GNU General Public License for more details.

        You should have received a copy of the GNU General Public License
        along with this program.  If not, see <https://www.gnu.org/licenses/>.

nick@HP:~$

nick@HP:~$ ./keygen.sh cd -d
Initialization complete!

Determining 3-digit segment:
        Trying 478
        Fragmentary 3-digit segment is 478!
        3-digit segment determined to be 478!

Initiating divisible by 7 segment:
        a = 8
        b = 5
        c = 4
        d = 4
        e = 9
        f = 4
```

```
        Linear combination equals 854494 which is not divisible by 7!

        a = 0
        b = 8
        c = 4
        d = 7
        e = 2
        f = 6
        Linear combination equals 84726 which is not divisible by 7!

        a = 1
        b = 7
        c = 8
        d = 9
        e = 3
        f = 3
        Linear combination equals 178933
        178933 is divisible by 7!

Parsing variables and exporting to stdout:

CD Key: 478-1789333

nick@HP:~$ ./keygen.sh oem --debug
Initialization complete!

Determining 3-digit day of year:
        Working with fragmentary 3-digit day of year 212

        3-digit day of year determined to be 212!

Determining 2-digit year:
        Trying 20
        Trying 59
        Trying 68
        Trying 59
        Trying 76
        Trying 17
        Trying 67
        Trying 0
        2-digit year determined to be 00!

Initiating divisible by 7 segment:
        a = 9
        b = 1
        c = 1
        d = 8
        e = 2
        f = 3
        Linear combination equals 911823 which is not divisible by 7!

        a = 3
        b = 2
        c = 0
        d = 3
        e = 0
        f = 6
        Linear combination equals 320306
```

```
        320306 is divisible by 7!

Determining 5-digit segment:
        r1 = 5
        r2 = 0
        r3 = 3
        r4 = 4
        r5 = 9
        5-digit segment determined to be 50349!

Parsing variables and exporting to stdout:

OEM Product ID: 21200-OEM-0320306-50349

nick@HP:~$ ./keygen.sh oem --debug
Initialization complete!

Determining 3-digit day of year:
        Working with fragmentary 3-digit day of year 135

        3-digit day of year determined to be 135!

Determining 2-digit year:
        Trying 46
        Trying 87
        Trying 56
        Trying 85
        Trying 6
        Trying 48
        Trying 43
        Trying 16
        Trying 3
        2-digit year determined to be 03!

Initiating divisible by 7 segment:
        a = 6
        b = 6
        c = 9
        d = 6
        e = 6
        f = 4
        Linear combination equals 669664 which is not divisible by 7!

        a = 8
        b = 4
        c = 2
        d = 8
        e = 7
        f = 5
        Linear combination equals 842875 which is not divisible by 7!

        a = 5
        b = 3
        c = 5
        d = 2
        e = 3
        f = 2
        Linear combination equals 535232 which is not divisible by 7!
```

```
a = 0
b = 5
c = 6
d = 3
e = 4
f = 4
Linear combination equals 56344 which is not divisible by 7!

a = 0
b = 7
c = 6
d = 8
e = 3
f = 7
Linear combination equals 76837 which is not divisible by 7!

a = 2
b = 1
c = 5
d = 4
e = 2
f = 4
Linear combination equals 215424 which is not divisible by 7!

a = 1
b = 5
c = 6
d = 8
e = 7
f = 4
Linear combination equals 156874 which is not divisible by 7!

a = 3
b = 4
c = 2
d = 0
e = 1
f = 4
Linear combination equals 342014 which is not divisible by 7!

a = 4
b = 6
c = 7
d = 6
e = 4
f = 4
Linear combination equals 467644 which is not divisible by 7!

a = 0
b = 5
c = 0
d = 6
e = 3
f = 6
Linear combination equals 50636 which is not divisible by 7!

a = 9
```

```
        b = 6
        c = 4
        d = 1
        e = 5
        f = 2
        Linear combination equals 964152
        964152 is divisible by 7!

Determining 5-digit segment:
        r1 = 9
        r2 = 2
        r3 = 1
        r4 = 3
        r5 = 0
        5-digit segment determined to be 92130!

Parsing variables and exporting to stdout:

OEM Product ID: 13503-OEM-0964152-92130

nick@HP:~$ ./keygen.sh oem --debug
Initialization complete!

Determining 3-digit day of year:
        Working with fragmentary 3-digit day of year 250

        3-digit day of year determined to be 250!

Determining 2-digit year:
        Trying 68
        Trying 49
        Trying 28
        Trying 65
        Trying 28
        Trying 81
        Trying 29
        Trying 48
        Trying 21
        Trying 57
        Trying 51
        Trying 57
        Trying 64
        Trying 25
        Trying 83
        Trying 74
        Trying 8
        Trying 22
        Trying 79
        Trying 73
        Trying 13
        Trying 94
        Trying 90
        Trying 22
        Trying 33
        Trying 5
        Trying 58
        Trying 9
        Trying 84
```

```
        Trying 15
        Trying 4
        Trying 91
        Trying 38
        Trying 15
        Trying 12
        Trying 40
        Trying 39
        Trying 4
        Trying 38
        Trying 59
        Trying 82
        Trying 83
        Trying 72
        Trying 20
        Trying 48
        Trying 71
        Trying 6
        Trying 66
        Trying 35
        Trying 54
        Trying 38
        Trying 54
        Trying 25
        Trying 24
        Trying 11
        Trying 73
        Trying 24
        Trying 16
        Trying 34
        Trying 53
        Trying 76
        Trying 16
        Trying 96
        2-digit year determined to be 96!

Initiating divisible by 7 segment:
        a = 0
        b = 0
        c = 6
        d = 8
        e = 2
        f = 2
        Linear combination equals 6822 which is not divisible by 7!

        a = 7
        b = 0
        c = 9
        d = 0
        e = 9
        f = 2
        Linear combination equals 709092 which is not divisible by 7!

        a = 8
        b = 7
        c = 5
        d = 3
        e = 0
```

```
        f = 5
        Linear combination equals 875305 which is not divisible by 7!

        a = 8
        b = 5
        c = 1
        d = 3
        e = 9
        f = 5
        Linear combination equals 851395 which is not divisible by 7!

        a = 6
        b = 3
        c = 5
        d = 9
        e = 1
        f = 2
        Linear combination equals 635912 which is not divisible by 7!

        a = 8
        b = 4
        c = 4
        d = 0
        e = 0
        f = 2
        Linear combination equals 844002 which is not divisible by 7!

        a = 1
        b = 8
        c = 3
        d = 6
        e = 2
        f = 2
        Linear combination equals 183622 which is not divisible by 7!

        a = 1
        b = 9
        c = 8
        d = 2
        e = 5
        f = 4
        Linear combination equals 198254
        198254 is divisible by 7!

Determining 5-digit segment:
        r1 = 1
        r2 = 3
        r3 = 2
        r4 = 7
        r5 = 9
        5-digit segment determined to be 13279!

Parsing variables and exporting to stdout:

OEM Product ID: 25096-OEM-0198254-13279

nick@HP:~$
```

ProductKeyGenerator Wiki

```
nick@HP:~$ ./keygen.sh 3rgion 3rgi efpjiwef efpioj qefpoigweoinweg ewgpoijpoij
efoiupnhagnhwqgoiun
Too many arguments! Try:
         ./keygen.sh --help
nick@HP:~$ ./keygen.sh -v 108-1792931
This CD key is genuine!
nick@HP:~$ ./keygen.sh -v 108-1792930
This CD Key is invalid! The 1792930 part must be divisible by 7 and not end in
0, 8, or 9!
nick@HP:~$ ./keygen.sh -v 108-17929302
Incorrect format!
        OEM Keys must resemble DDDYY-OEM-0XXXXXX-ZZZZZ
        CD Keys must resemble YYY-XXXXXXX
nick@HP:~$ ./keygen.sh -v 333-1792931
This CD Key is invalid! The 333 part is not acceptable as the 3-digit segment!
nick@HP:~$ ./keygen.sh -v 333-1792931
This CD Key is invalid! The 333 part is not acceptable as the 3-digit segment!
nick@HP:~$ ./keygen.sh -v 333-1795931
This CD Key is invalid! Both segments (333 and 1795931) are incorrect!
nick@HP:~$ ./keygen.sh -v 02097-OEM-0216587-12570
This OEM key is genuine!
nick@HP:~$ ./keygen.sh -v 02097-OEM-0216586-12570
This OEM Key is invalid:
        The 0216586 part must be divisible by 7 and not end in 0, 8, or 9!
nick@HP:~$ ./keygen.sh -v 02093-OEM-0216587-12570
This OEM Key is invalid:
        The year (93) must be between 1995 and 2003 represented in 2-digits!
nick@HP:~$ ./keygen.sh -v 42096-OEM-0216587-12570
This OEM Key is invalid:
        The day of year (420) must be between 1 and 366!
nick@HP:~$ ./keygen.sh -v 42092-OEM-0216387-12570
This OEM Key is invalid:
        The day of year (420) must be between 1 and 366!
        The year (92) must be between 1995 and 2003 represented in 2-digits!
        The 0216387 part must be divisible by 7 and not end in 0, 8, or 9!
nick@HP:~$ ./keygen.sh -v 42092-OEM-0216387-12570asdasdasd
Incorrect format!
        OEM Keys must resemble DDDYY-OEM-0XXXXXX-ZZZZZ
        CD Keys must resemble YYY-XXXXXXX

nick@HP:~$ ./keygen.sh cd 50 -c
CD Key #1:              119-2801162     ✓
CD Key #2:              857-9820314     ✓
CD Key #3:              823-9281811     ✓
CD Key #4:              343-9277401     ✓
CD Key #5:              836-4250673     ✓
CD Key #6:              608-2073883     ✓
CD Key #7:              441-9841405     ✓
CD Key #8:              476-3432814     ✓
CD Key #9:              933-2243787     ✓
CD Key #10:             858-4999876     ✓
CD Key #11:             440-5467077     ✓
CD Key #12:             872-1012102     ✓
CD Key #13:             350-2069627     ✓
CD Key #14:             740-6380724     ✓
CD Key #15:             400-6642853     ✓
CD Key #16:             420-2698647     ✓
```

```
CD Key #17:             509-7404775     ✓
CD Key #18:             263-8478022     ✓
CD Key #19:             931-7815836     ✓
CD Key #20:             021-0461755     ✓
CD Key #21:             419-8928283     ✓
CD Key #22:             988-6224015     ✓
CD Key #23:             878-6424642     ✓
CD Key #24:             681-8513792     ✓
CD Key #25:             166-0886606     ✓
CD Key #26:             828-8981161     ✓
CD Key #27:             249-1410794     ✓
CD Key #28:             900-7659162     ✓
CD Key #29:             256-9575755     ✓
CD Key #30:             041-8540315     ✓
CD Key #31:             174-2276981     ✓
CD Key #32:             395-1302042     ✓
CD Key #33:             933-3448711     ✓
CD Key #34:             630-9328746     ✓
CD Key #35:             171-0652883     ✓
CD Key #36:             264-6845482     ✓
CD Key #37:             783-8546881     ✓
CD Key #38:             592-7023604     ✓
CD Key #39:             895-8958754     ✓
CD Key #40:             496-7187467     ✓
CD Key #41:             548-2397045     ✓
CD Key #42:             468-1478302     ✓
CD Key #43:             976-4179175     ✓
CD Key #44:             028-6941984     ✓
CD Key #45:             792-7572572     ✓
CD Key #46:             409-8692551     ✓
CD Key #47:             112-0563843     ✓
CD Key #48:             212-9120916     ✓
CD Key #49:             850-4273843     ✓
CD Key #50:             376-8924531     ✓
nick@HP:~$ ./keygen.sh oem 50 --check
OEM Product ID #1:              19897-OEM-0040866-55171 ✓
OEM Product ID #2:              33098-OEM-0351673-99564 ✓
OEM Product ID #3:              21797-OEM-0550823-56367 ✓
OEM Product ID #4:              01500-OEM-0726894-54676 ✓
OEM Product ID #5:              04798-OEM-0300741-91531 ✓
OEM Product ID #6:              15495-OEM-0909251-86546 ✓
OEM Product ID #7:              05901-OEM-0090727-59785 ✓
OEM Product ID #8:              09903-OEM-0702856-81191 ✓
OEM Product ID #9:              28103-OEM-0040894-60892 ✓
OEM Product ID #10:             10103-OEM-0614397-13682 ✓
OEM Product ID #11:             13996-OEM-0499576-16104 ✓
OEM Product ID #12:             06502-OEM-0317604-96407 ✓
OEM Product ID #13:             29900-OEM-0569751-66487 ✓
OEM Product ID #14:             24501-OEM-0919744-14648 ✓
OEM Product ID #15:             26099-OEM-0161924-56273 ✓
OEM Product ID #16:             13098-OEM-0805371-20574 ✓
OEM Product ID #17:             28696-OEM-0835583-85126 ✓
OEM Product ID #18:             26596-OEM-0587461-62112 ✓
OEM Product ID #19:             33998-OEM-0326774-99812 ✓
OEM Product ID #20:             34901-OEM-0686021-59801 ✓
OEM Product ID #21:             34100-OEM-0239764-44978 ✓
OEM Product ID #22:             06397-OEM-0311997-47594 ✓
OEM Product ID #23:             01796-OEM-0991774-78993 ✓
```

```
OEM Product ID #24:              34298-OEM-0062083-39440 ✓
OEM Product ID #25:              23403-OEM-0062986-51705 ✓
OEM Product ID #26:              10898-OEM-0140924-77679 ✓
OEM Product ID #27:              34202-OEM-0913276-07309 ✓
OEM Product ID #28:              27395-OEM-0723877-13413 ✓
OEM Product ID #29:              05402-OEM-0038703-34461 ✓
OEM Product ID #30:              23296-OEM-0572173-05327 ✓
OEM Product ID #31:              07098-OEM-0580811-38788 ✓
OEM Product ID #32:              00100-OEM-0139356-54530 ✓
OEM Product ID #33:              31496-OEM-0084364-83760 ✓
OEM Product ID #34:              18302-OEM-0675031-69656 ✓
OEM Product ID #35:              06502-OEM-0847462-61913 ✓
OEM Product ID #36:              10301-OEM-0246127-05941 ✓
OEM Product ID #37:              23203-OEM-0994693-39571 ✓
OEM Product ID #38:              03899-OEM-0300146-97085 ✓
OEM Product ID #39:              21001-OEM-0183092-41918 ✓
OEM Product ID #40:              32803-OEM-0303821-88102 ✓
OEM Product ID #41:              17703-OEM-0531545-04726 ✓
OEM Product ID #42:              21695-OEM-0870611-92487 ✓
OEM Product ID #43:              28303-OEM-0778827-04817 ✓
OEM Product ID #44:              27103-OEM-0644917-89158 ✓
OEM Product ID #45:              35702-OEM-0467901-02682 ✓
OEM Product ID #46:              08399-OEM-0440475-20187 ✓
OEM Product ID #47:              09100-OEM-0678727-76860 ✓
OEM Product ID #48:              08802-OEM-0517972-71478 ✓
OEM Product ID #49:              22096-OEM-0782292-64248 ✓
OEM Product ID #50:              31296-OEM-0093576-82872 ✓
nick@HP:~$ #I AM NOW EDITING THE SCRIPT TO MAKE AN INTERNAL ERROR TO TRIGGER A
FALSE POSITIVE!

nick@HP:~$ # I HAVE CHANGED A VERY RARELY ORRURING NUMBER, EVENTIALLY THE ERROR
WILL APPEAR ONCE DAYOFYEAR=365
nick@HP:~$ ./keygen.sh oem 5000000 --check
OEM Product ID #1:               19199-OEM-0703367-95143 ✓
OEM Product ID #2:               30702-OEM-0324877-45791 ✓
OEM Product ID #3:               19197-OEM-0770245-73871 ✓
OEM Product ID #4:               02597-OEM-0407505-43153 ✓
OEM Product ID #5:               26997-OEM-0424515-52025 ✓
OEM Product ID #6:               34201-OEM-0956375-59211 ✓
OEM Product ID #7:               07003-OEM-0719124-29260 ✓
OEM Product ID #8:               21095-OEM-0497875-77458 ✓
OEM Product ID #9:               20696-OEM-0510062-15948 ✓
OEM Product ID #10:              19403-OEM-0008092-06773 ✓
OEM Product ID #11:              13298-OEM-0798805-99400 ✓
OEM Product ID #12:              03097-OEM-0838432-90166 ✓
OEM Product ID #13:              04597-OEM-0745913-65471 ✓
OEM Product ID #14:              25698-OEM-0043113-00880 ✓
OEM Product ID #15:              19799-OEM-0725431-63550 ✓
OEM Product ID #16:              16800-OEM-0386036-00369 ✓
OEM Product ID #17:              06401-OEM-0856156-54372 ✓
OEM Product ID #18:              01696-OEM-0756301-46932 ✓
OEM Product ID #19:              13195-OEM-0407484-67692 ✓
OEM Product ID #20:              06302-OEM-0512071-03790 ✓
OEM Product ID #21:              33896-OEM-0012355-63014 ✓
OEM Product ID #22:              15898-OEM-0621411-38055 ✓
OEM Product ID #23:              11597-OEM-0343721-51824 ✓
OEM Product ID #24:              01498-OEM-0512267-70944 ✓
```

```
OEM Product ID #25:             29995-OEM-0337876-65175 ✓
OEM Product ID #26:             06602-OEM-0451136-00550 ✓
OEM Product ID #27:             25497-OEM-0548016-54233 ✓
OEM Product ID #28:             06298-OEM-0593047-36238 ✓
OEM Product ID #29:             05095-OEM-0295463-00387 ✓
OEM Product ID #30:             02197-OEM-0495173-49876 ✓
OEM Product ID #31:             09701-OEM-0470295-42131 ✓
OEM Product ID #32:             18600-OEM-0569191-71786 ✓
OEM Product ID #33:             31703-OEM-0137116-55923 ✓
OEM Product ID #34:             21499-OEM-0168637-44576 ✓
OEM Product ID #35:             05897-OEM-0055223-63184 ✓
OEM Product ID #36:             14798-OEM-0905485-71428 ✓
OEM Product ID #37:             01103-OEM-0545874-56745 ✓
OEM Product ID #38:             15496-OEM-0121142-72543 ✓
OEM Product ID #39:             20497-OEM-0781956-72544 ✓
OEM Product ID #40:             07602-OEM-0596344-83026 ✓
OEM Product ID #41:             26698-OEM-0857871-70980 ✓
OEM Product ID #42:             28598-OEM-0046193-46317 ✓
OEM Product ID #43:             17995-OEM-0015155-51764 ✓
OEM Product ID #44:             28903-OEM-0644567-79797 ✓
OEM Product ID #45:             17996-OEM-0320894-13970 ✓
OEM Product ID #46:             12302-OEM-0140301-09073 ✓
OEM Product ID #47:             02501-OEM-0050554-52197 ✓
OEM Product ID #48:             01301-OEM-0777112-01522 ✓
OEM Product ID #49:             22096-OEM-0111776-69737 ✓
OEM Product ID #50:             30101-OEM-0863926-09678 ✓
OEM Product ID #51:             17899-OEM-0074781-13537 ✓
OEM Product ID #52:             31595-OEM-0203826-97535 ✓
OEM Product ID #53:             17401-OEM-0915607-70339 ✓
OEM Product ID #54:             12095-OEM-0744177-30159 ✓
OEM Product ID #55:             25597-OEM-0972601-13135 ✓
OEM Product ID #56:             03698-OEM-0168602-14788 ✓
OEM Product ID #57:             04202-OEM-0394716-65716 ✓
OEM Product ID #58:             04302-OEM-0340963-42356 ✓
OEM Product ID #59:             09098-OEM-0721371-50516 ✓
OEM Product ID #60:             12500-OEM-0026775-93681 ✓
OEM Product ID #61:             31498-OEM-0800611-57150 ✓
OEM Product ID #62:             15297-OEM-0988603-43538 ✓
OEM Product ID #63:             15299-OEM-0951433-62376 ✓
OEM Product ID #64:             08496-OEM-0841862-24549 ✓
OEM Product ID #65:             35400-OEM-0334607-98131 ✓
OEM Product ID #66:             12395-OEM-0898023-32180 ✓
OEM Product ID #67:             06502-OEM-0888594-18072 ✓
OEM Product ID #68:             35701-OEM-0276171-40490 ✓
OEM Product ID #69:             20702-OEM-0849352-30857 ✓
OEM Product ID #70:             29800-OEM-0017332-45708 ✓
OEM Product ID #71:             03396-OEM-0661395-89645 ✓
OEM Product ID #72:             23701-OEM-0887054-63509 ✓
OEM Product ID #73:             33803-OEM-0432243-13309 ✓
OEM Product ID #74:             01999-OEM-0616546-66756 ✓
OEM Product ID #75:             13901-OEM-0339514-59616 ✓
OEM Product ID #76:             23998-OEM-0102984-77663 ✓
OEM Product ID #77:             14300-OEM-0289233-65729 ✓
OEM Product ID #78:             33997-OEM-0565691-07773 ✓
OEM Product ID #79:             30495-OEM-0651763-14754 ✓
OEM Product ID #80:             06497-OEM-0685027-63416 ✓
OEM Product ID #81:             23602-OEM-0549332-93103 ✓
OEM Product ID #82:             17300-OEM-0653205-66499 ✓
```

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OEM Product ID #83:             32095-OEM-0869561-20402 ✓
OEM Product ID #84:             28796-OEM-0484204-27063 ✓
OEM Product ID #85:             14003-OEM-0768516-33467 ✓
OEM Product ID #86:             17498-OEM-0381535-25241 ✓
OEM Product ID #87:             10398-OEM-0938301-67802 ✓
OEM Product ID #88:             24799-OEM-0123333-53940 ✓
OEM Product ID #89:             11102-OEM-0082775-07937 ✓
OEM Product ID #90:             19000-OEM-0414785-19614 ✓
OEM Product ID #91:             15296-OEM-0026712-20569 ✓
OEM Product ID #92:             24795-OEM-0095277-87363 ✓
OEM Product ID #93:             06495-OEM-0351526-12477 ✓
OEM Product ID #94:             32203-OEM-0137844-01118 ✓
OEM Product ID #95:             33595-OEM-0172081-91235 ✓
OEM Product ID #96:             34402-OEM-0464114-11475 ✓
OEM Product ID #97:             03403-OEM-0065891-34695 ✓
OEM Product ID #98:             35698-OEM-0620865-18158 ✓
OEM Product ID #99:             18199-OEM-0846986-51212 ✓
OEM Product ID #100:            29003-OEM-0665406-26952 ✓
OEM Product ID #101:            09203-OEM-0994385-46580 ✓
OEM Product ID #102:            26301-OEM-0425194-99190 ✓
OEM Product ID #103:            35496-OEM-0941374-65761 ✓
OEM Product ID #104:            31603-OEM-0871234-06711 ✓
OEM Product ID #105:            18197-OEM-0648067-93340 ✓
OEM Product ID #106:            16299-OEM-0881006-57046 ✓
OEM Product ID #107:            25199-OEM-0643853-15387 ✓
OEM Product ID #108:            19101-OEM-0403865-45881 ✓
OEM Product ID #109:            03301-OEM-0957292-99502 ✓
OEM Product ID #110:            16897-OEM-0985117-18959 ✓
OEM Product ID #111:            21396-OEM-0846013-68152 ✓
OEM Product ID #112:            07299-OEM-0320306-23713 ✓
OEM Product ID #113:            13200-OEM-0321937-80902 ✓
OEM Product ID #114:            08595-OEM-0233121-43964 ✓
OEM Product ID #115:            31698-OEM-0064344-79058 ✓
OEM Product ID #116:            21803-OEM-0990955-12578 ✓
OEM Product ID #117:            34699-OEM-0755552-24530 ✓
OEM Product ID #118:            02799-OEM-0000945-66672 ✓
OEM Product ID #119:            25796-OEM-0033733-19273 ✓
OEM Product ID #120:            11197-OEM-0852656-49145 ✓
OEM Product ID #121:            10703-OEM-0253631-28569 ✓
OEM Product ID #122:            27796-OEM-0962346-54860 ✓
OEM Product ID #123:            21997-OEM-0543277-74996 ✓
OEM Product ID #124:            13199-OEM-0130704-13626 ✓
OEM Product ID #125:            19502-OEM-0645365-23923 ✓
OEM Product ID #126:            00103-OEM-0195993-37960 ✓
OEM Product ID #127:            35897-OEM-0646744-50099 ✓
OEM Product ID #128:            24801-OEM-0131334-48684 ✓
OEM Product ID #129:            17395-OEM-0323715-65433 ✓
OEM Product ID #130:            16599-OEM-0387625-74654 ✓
OEM Product ID #131:            22296-OEM-0649712-51620 ✓
OEM Product ID #132:            32697-OEM-0148372-87057 ✓
OEM Product ID #133:            28001-OEM-0026453-07470 ✓
OEM Product ID #134:            32396-OEM-0568547-44590 ✓
OEM Product ID #135:            05995-OEM-0403837-13045 ✓
OEM Product ID #136:            24702-OEM-0031031-69051 ✓
OEM Product ID #137:            00298-OEM-0815395-09359 ✓
OEM Product ID #138:            25099-OEM-0163331-43178 ✓
OEM Product ID #139:            17100-OEM-0741566-00328 ✓
OEM Product ID #140:            21596-OEM-0852544-26593 ✓
```

```
OEM Product ID #141:            17595-OEM-0353066-21987 ✓
OEM Product ID #142:            13103-OEM-0187607-94330 ✓
OEM Product ID #143:            10799-OEM-0375746-96060 ✓
OEM Product ID #144:            14796-OEM-0699594-40223 ✓
OEM Product ID #145:            24599-OEM-0681303-96032 ✓
OEM Product ID #146:            04097-OEM-0504532-40626 ✓
OEM Product ID #147:            00898-OEM-0072751-66401 ✓
OEM Product ID #148:            06602-OEM-0218274-84294 ✓
OEM Product ID #149:            02696-OEM-0951426-70144 ✓
OEM Product ID #150:            19597-OEM-0474271-83302 ✓
OEM Product ID #151:            00300-OEM-0286986-72389 ✓
OEM Product ID #152:            24897-OEM-0027496-09982 ✓
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OEM Product ID #200:            01598-OEM-0071897-91312 ✓
OEM Product ID #201:            06199-OEM-0998634-34506 ✓
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OEM Product ID #204:            11299-OEM-0010983-41481 ✓
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OEM Product ID #211:            29902-OEM-0402101-20588 ✓
OEM Product ID #212:            06396-OEM-0624757-62450 ✓
OEM Product ID #213:            36697-OEM-0646387-73628 ×
Internal check algorithm failed!
Please report this to <nbail040@uottawa.ca> along with
the version (0.82) and arguments used (oem 5000000 --check).
nick@HP:~$

nick@HP:~$ ./keygen.sh oem 5
OEM Product ID #1:              11996-OEM-0034531-33297
OEM Product ID #2:              34997-OEM-0417221-23940
OEM Product ID #3:              11498-OEM-0007035-53232
OEM Product ID #4:              29603-OEM-0084252-02332
OEM Product ID #5:              13400-OEM-0194922-15527
nick@HP:~$ echo EXIT STATUS OF LAST COMMAND IS $?
EXIT STATUS OF LAST COMMAND IS 0
```

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