# Report on the python hashing implementation.

## General Overview:

pyHasher normalizes a file and creates a hash for it. The normalization is done by running mnfy3 or mnfy2, and if both fail, falling back to mnfyfailsafe, then creating a sha512 hash of the output file. It can be run in either python2 or python3, as long as both are installed.

## Usage instructions:

To hash a single file, use the following command:

‘pyHasher.py <filename>’

Optionally, to see the normalized file, append ‘—dump’. (though this is only useful for debugging/test)

## Assumptions:

### Differences between ASTs:

|  |  |  |  |
| --- | --- | --- | --- |
| Python 2.4 | Python 2.5 | Python 2.6 | Python 3.3 |
| \*Cant be found/Does not exist | ImportFrom module was not optional in 2.5  Set/SetComp/DictComp were introduced in 2.7 | ImportFrom module was not optional in 2.5  Set/SetComp/DictComp were introduced in 2.7 | Guide:  + implies only in 3.3  - implies only in 2.7  ~ implies in both 2.7 and 3.3 but different.  +WithItem  +Starred  +Bytes  +YieldFrom  +NonLocal  +Arg  +Annotations  ~ClassDef  ~FunctionDef  ~Raise  ~ExceptHandler  ~With  ~Arguments  ~TryExcept/TryFinally/Try  -Print  -Exec  -Repr |

### Changes Made and Status:

|  |  |  |  |
| --- | --- | --- | --- |
| Change | Developed | Tested | Notes |
| WithItem | N/A | N/A | Removed |
| Starred | N/A | N/A | Removed |
| Bytes | N/A | N/A | Removed |
| YieldFrom | N/A | N/A | Removed |
| NonLocal | N/A | N/A | Removed |
| Arg | N/A | N/A | Removed |
| Annotations | N/A | N/A | Removed |
| ClassDef | ✓ | ✓ | Keywords, \*args and kwargs Removed. |
| Function Def | ✓ | ✓ | Returns removed |
| Raise | ✓ | ✓ | Tracebacks added |
| ExceptHandler | N/A | N/A | Both expr? And identifier? Handled in same way.  No Change required. |
| With | ✓ | ✓ | WithItem replaced. However the safe-transformation “CombineWithStatements” was not ported to 2.7 |
| Arguments | ✓ | ✓ | Keyword only args, annotations and default keyword args removed. |
| Try [Except/Finally] | ✓ | ✓ | Try split into Try Except and Try Finally. However the safe-transformation “visit\_TryExcept” in “EliminateUnusedConstants” has not been ported. |
| Print | ✓ | ✓ | Works fine except:  Print(‘hello’) will become print ‘hello’ in mnfy2.7  But remain print(‘hello’) in mnfy3.3. |
| Exec | ✓ | ✓ | Added |
| Repr | ✓ | N/A | Repr is theoretically implemented, but ast.parse() treats repr as a function call instead of a node, so its  not possible to test. (The code is never executed) |

## Known Issues:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # | Issue | Location | Impact | Severity | Action |
| 1 | Slicing error-  P=(p+[1,2,3])[:1]  Gets minified to  P=p+[1,2,3][:1]  Which has different meaning. | Mnfy27, Mnfy33 | No impact on hashing because its consistant. Is an issue for mnfy’s standalone goals of portable code. | Low | No action required for hashing /RedHat purposes. |
| 2 | Some docstrings are referenced by \_\_doc\_\_ call in python. Docstrings are removed by mnfy, causing compile/run problems. | Mnfy27,Mnfy33 | No impact on hashing because code does not need to compile and removal of docstrings is consistent. | Low | No action required for hashing/RedHat purposes. |
| 3 | Big Numbers:  For some reason, reading and printing very large numbers (in the order of 10\*\*10) causes digits to be lost. | Mnfy27, but I think it is in all of Python. | Potential hashing risk, because large numbers could change code execution, though both hashes would be the same. | Medium | Not really sure if there is a fix for this one. |
|  |  |  |  |  |  |

## Testing Report:

Test scripts:

/libs/mnfy33/test\_mnfy.py - Unit Testing of Mnfy33 (written by Brett Cannon)

/libs/mnfy33/verify\_mnfy.py - Coverage Testing (written by Brett Cannon)

/libs/mnfy273/test\_mnfy.py - Unit Testing of Mnfy27 (modified from mnfy3300 version)

* Fails on test\_empty\_Try because unused try transform has not been ported.

/libs/mnfy273/verify\_mnfy.py - Coverage Testing of Mnfy27 (modified from mnfy3300 version)

* Fails on aifc.py because of Issue#3 and on urllib because of Issue#1.

/libs/mnfyFailSafe/test\_mnfy.py - Unit Testing of MnfyFailSafe

testHasher.py – Testing of hashing function/blackbox testing/testing multiple environments.

\*Note: Not all tests pass, because of the issues listed above.