Checkpoint 2

p7zip

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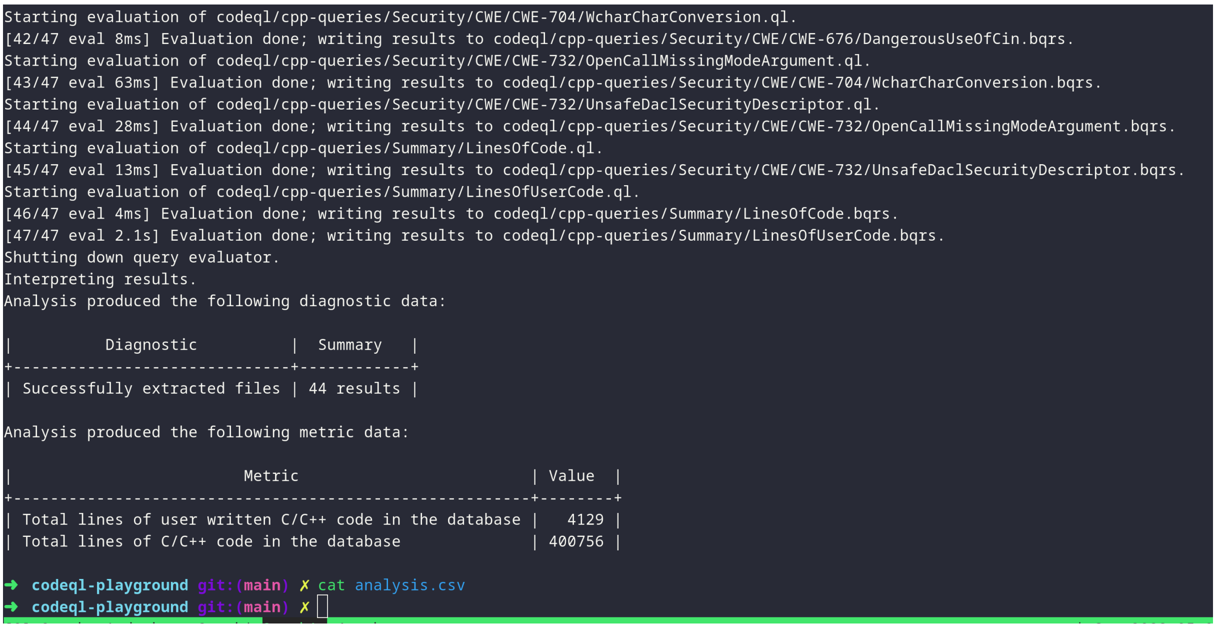
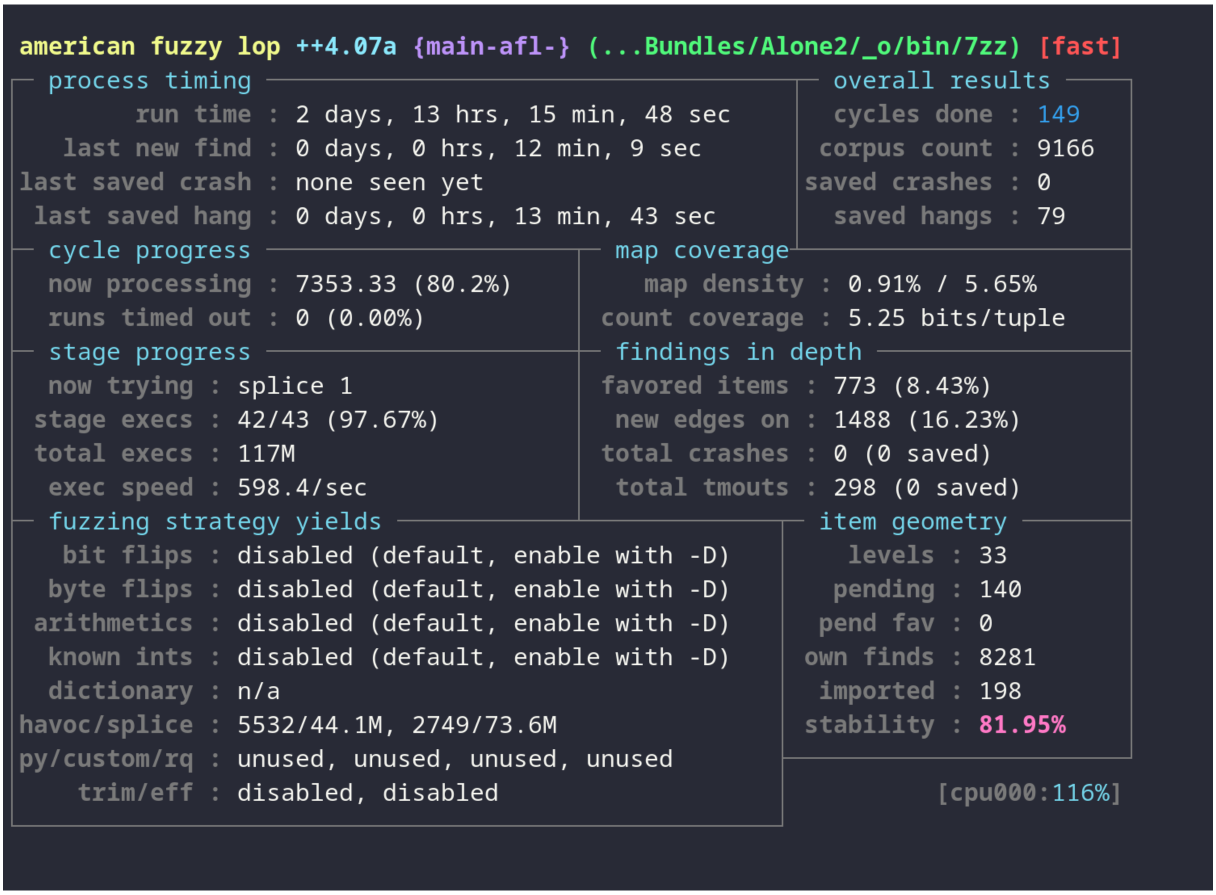
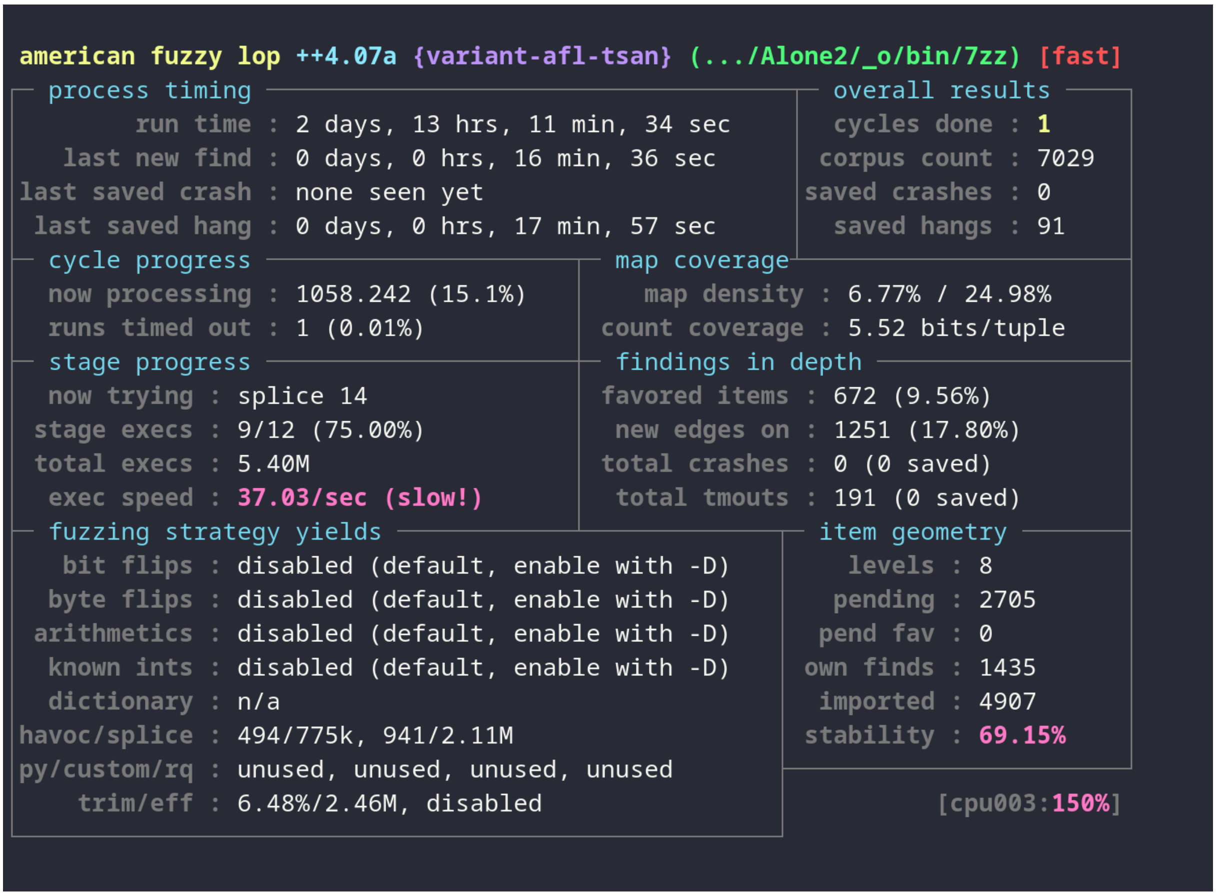


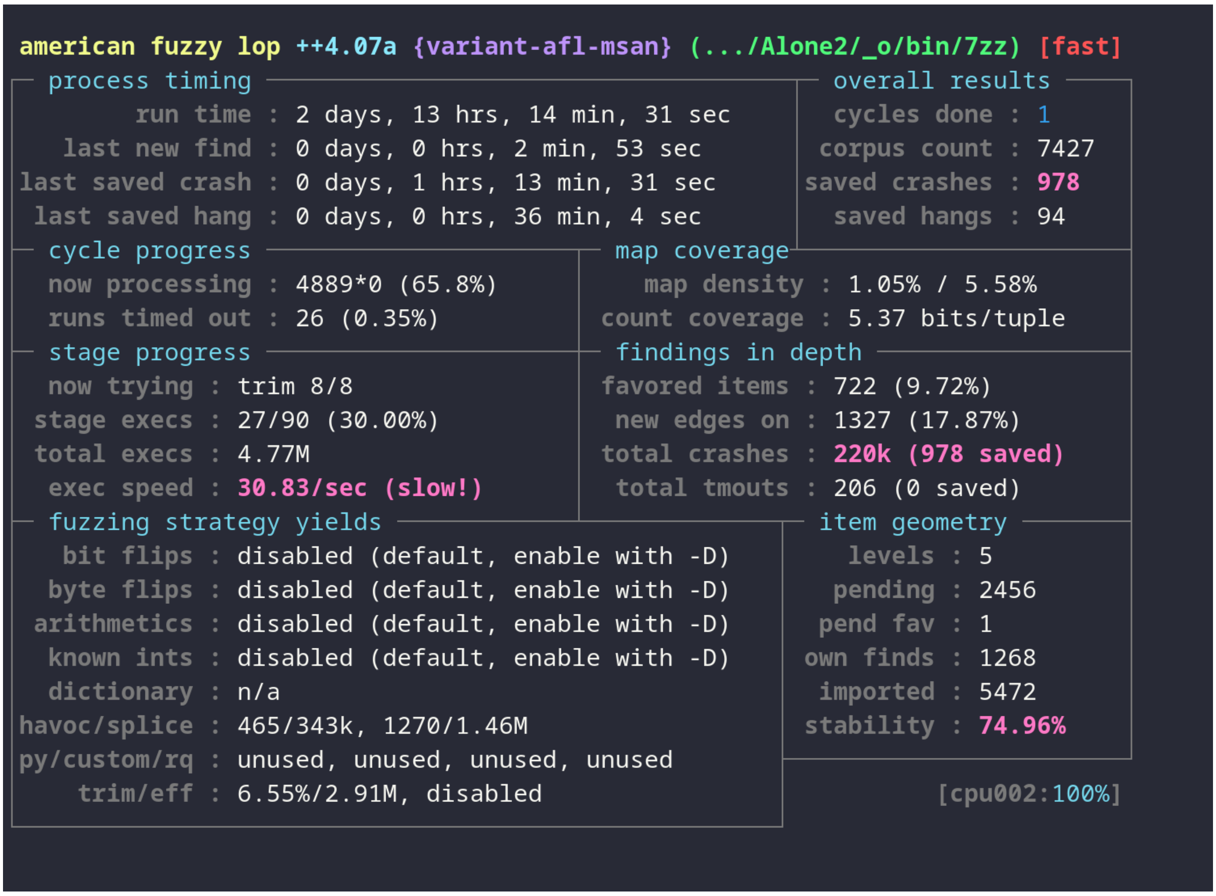
```
Starting evaluation of codeql/cpp-queries/Security/CWE/CWE-704/WcharCharConversion.ql.
[42/47 eval 8ms] Evaluation done; writing results to codeql/cpp-queries/Security/CWE/CWE-676/DangerousUseOfCin.bqrs.
Starting evaluation of codeql/cpp-queries/Security/CWE/CWE-732/OpenCallMissingModeArgument.ql.
[43/47 eval 63ms] Evaluation done; writing results to codeql/cpp-queries/Security/CWE/CWE-704/WcharCharConversion.bqrs.
Starting evaluation of codeql/cpp-queries/Security/CWE/CWE-732/UnsafeDaclSecurityDescriptor.ql.
[44/47 eval 28ms] Evaluation done; writing results to codeql/cpp-queries/Security/CWE/CWE-732/OpenCallMissingModeArgument.bqrs.
Starting evaluation of codeql/cpp-queries/Summary/LinesOfCode.ql.
[45/47 eval 13ms] Evaluation done; writing results to codeql/cpp-queries/Security/CWE/CWE-732/UnsafeDaclSecurityDescriptor.bqrs.
Starting evaluation of codeql/cpp-queries/Summary/LinesOfUserCode.ql.
[46/47 eval 4ms] Evaluation done; writing results to codeql/cpp-queries/Summary/LinesOfCode.bqrs.
[47/47 eval 2.1s] Evaluation done; writing results to codeql/cpp-queries/Summary/LinesOfUserCode.bqrs.
Shutting down query evaluator.
Interpreting results.
Analysis produced the following diagnostic data:

|          Diagnostic          |  Summary   |
+------------------------------+------------+
| Successfully extracted files | 44 results |

Analysis produced the following metric data:

|                         Metric                          | Value  |
+---------------------------------------------------------+--------+
| Total lines of user written C/C++ code in the database |   4129 |
| Total lines of C/C++ code in the database               | 400756 |

➜  codeql-playground git:(main) ✗ cat analysis.csv
➜  codeql-playground git:(main) ✗ ▯
```



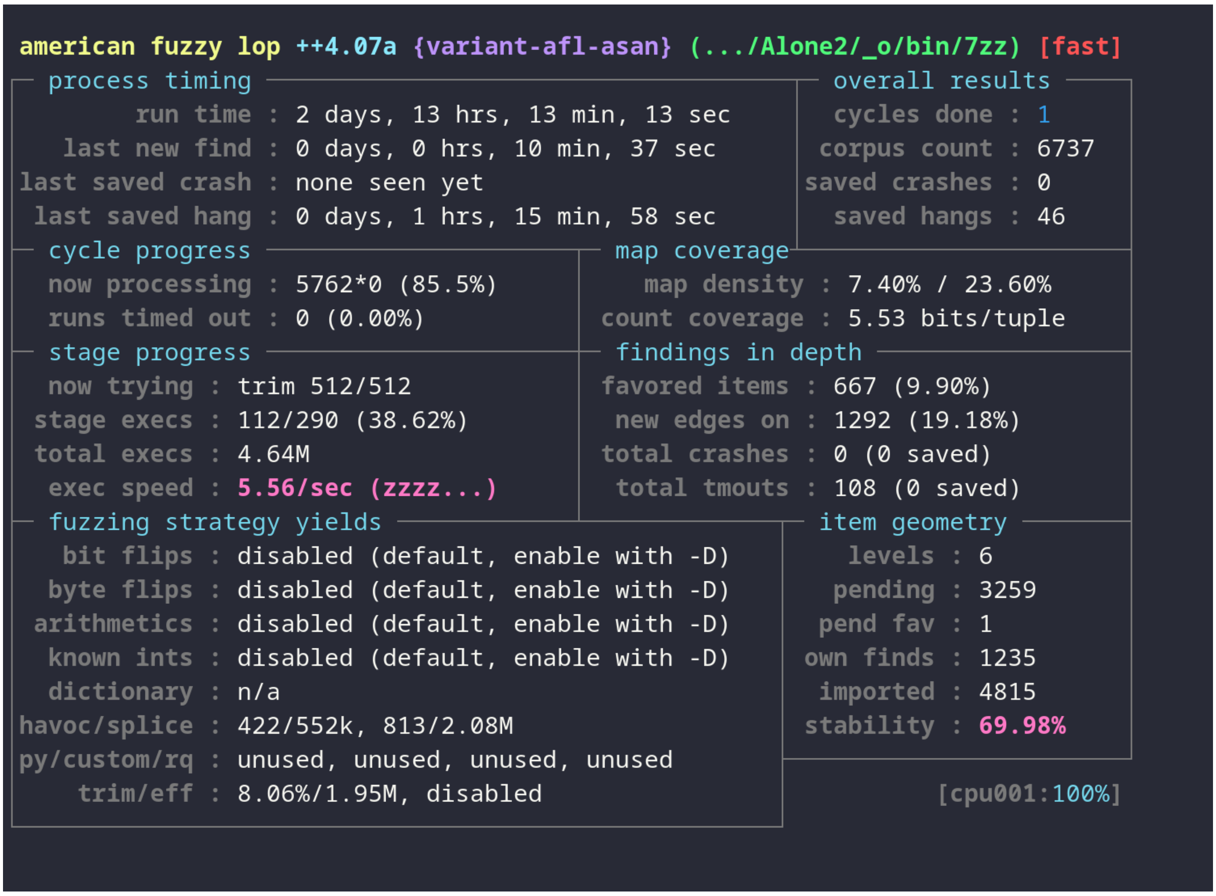
```
 american fuzzy lop ++4.07a {main-afl-} (...Bundles/Alone2/_o/bin/7zz) [fast]
┌─ process timing ────────────────────────────────────┬─ overall results ────┐
│        run time : 2 days, 13 hrs, 15 min, 48 sec    │  cycles done : 149   │
│   last new find : 0 days, 0 hrs, 12 min, 9 sec      │ corpus count : 9166  │
│last saved crash : none seen yet                     │saved crashes : 0     │
│ last saved hang : 0 days, 0 hrs, 13 min, 43 sec     │  saved hangs : 79    │
├─ cycle progress ─────────────────────┬─ map coverage┴──────────────────────┤
│  now processing : 7353.33 (80.2%)    │    map density : 0.91% / 5.65%      │
│  runs timed out : 0 (0.00%)          │ count coverage : 5.25 bits/tuple    │
├─ stage progress ─────────────────────┼─ findings in depth ─────────────────┤
│  now trying : splice 1               │ favored items : 773 (8.43%)         │
│ stage execs : 42/43 (97.67%)         │  new edges on : 1488 (16.23%)       │
│ total execs : 117M                   │ total crashes : 0 (0 saved)         │
│  exec speed : 598.4/sec              │  total tmouts : 298 (0 saved)       │
├─ fuzzing strategy yields ────────────┴─────────────┬─ item geometry ───────┤
│   bit flips : disabled (default, enable with -D)   │    levels : 33        │
│  byte flips : disabled (default, enable with -D)   │   pending : 140       │
│ arithmetics : disabled (default, enable with -D)   │  pend fav : 0         │
│  known ints : disabled (default, enable with -D)   │ own finds : 8281      │
│  dictionary : n/a                                  │  imported : 198       │
│havoc/splice : 5532/44.1M, 2749/73.6M               │ stability : 81.95%    │
│py/custom/rq : unused, unused, unused, unused       ├───────────────────────┘
│    trim/eff : disabled, disabled                   │          [cpu000:116%]
└────────────────────────────────────────────────────┘
```



```
american fuzzy lop ++4.07a {variant-afl-tsan} (.../Alone2/_o/bin/7zz) [fast]
┌─ process timing ────────────────────────────────────┬─ overall results ───┐
│        run time : 2 days, 13 hrs, 11 min, 34 sec     │  cycles done : 1     │
│   last new find : 0 days, 0 hrs, 16 min, 36 sec      │ corpus count : 7029  │
│last saved crash : none seen yet                      │saved crashes : 0     │
│ last saved hang : 0 days, 0 hrs, 17 min, 57 sec      │  saved hangs : 91    │
├─ cycle progress ─────────────────────┬─ map coverage─┴──────────────────────┤
│  now processing : 1058.242 (15.1%)   │    map density : 6.77% / 24.98%      │
│  runs timed out : 1 (0.01%)          │ count coverage : 5.52 bits/tuple     │
├─ stage progress ─────────────────────┼─ findings in depth ──────────────────┤
│  now trying : splice 14              │ favored items : 672 (9.56%)          │
│ stage execs : 9/12 (75.00%)          │  new edges on : 1251 (17.80%)        │
│ total execs : 5.40M                  │ total crashes : 0 (0 saved)          │
│  exec speed : 37.03/sec (slow!)      │  total tmouts : 191 (0 saved)        │
├─ fuzzing strategy yields ────────────┴─────────────┬─ item geometry ───────┤
│   bit flips : disabled (default, enable with -D)   │    levels : 8         │
│  byte flips : disabled (default, enable with -D)   │   pending : 2705      │
│ arithmetics : disabled (default, enable with -D)   │  pend fav : 0         │
│  known ints : disabled (default, enable with -D)   │ own finds : 1435      │
│  dictionary : n/a                                  │  imported : 4907      │
│havoc/splice : 494/775k, 941/2.11M                  │ stability : 69.15%    │
│py/custom/rq : unused, unused, unused, unused       ├───────────────────────┘
│    trim/eff : 6.48%/2.46M, disabled                │          [cpu003:150%]
└────────────────────────────────────────────────────┘
```



```
american fuzzy lop ++4.07a {variant-afl-msan} (.../Alone2/_o/bin/7zz) [fast]
┌─ process timing ────────────────────────────────────┬─ overall results ────┐
│        run time : 2 days, 13 hrs, 14 min, 31 sec    │  cycles done : 1     │
│   last new find : 0 days, 0 hrs, 2 min, 53 sec      │ corpus count : 7427  │
│last saved crash : 0 days, 1 hrs, 13 min, 31 sec     │saved crashes : 978   │
│ last saved hang : 0 days, 0 hrs, 36 min, 4 sec      │  saved hangs : 94    │
├─ cycle progress ─────────────────────┬─ map coverage┴──────────────────────┤
│  now processing : 4889*0 (65.8%)     │    map density : 1.05% / 5.58%      │
│  runs timed out : 26 (0.35%)         │ count coverage : 5.37 bits/tuple    │
├─ stage progress ─────────────────────┼─ findings in depth ─────────────────┤
│  now trying : trim 8/8               │ favored items : 722 (9.72%)         │
│ stage execs : 27/90 (30.00%)         │  new edges on : 1327 (17.87%)       │
│ total execs : 4.77M                  │ total crashes : 220k (978 saved)    │
│  exec speed : 30.83/sec (slow!)      │  total tmouts : 206 (0 saved)       │
├─ fuzzing strategy yields ────────────┴───────────┬─ item geometry ────────┤
│   bit flips : disabled (default, enable with -D) │    levels : 5          │
│  byte flips : disabled (default, enable with -D) │   pending : 2456       │
│ arithmetics : disabled (default, enable with -D) │  pend fav : 1          │
│  known ints : disabled (default, enable with -D) │ own finds : 1268       │
│  dictionary : n/a                                │  imported : 5472       │
│havoc/splice : 465/343k, 1270/1.46M               │ stability : 74.96%     │
│py/custom/rq : unused, unused, unused, unused     ├────────────────────────┘
│    trim/eff : 6.55%/2.91M, disabled              │          [cpu002:100%]
└──────────────────────────────────────────────────┘
```

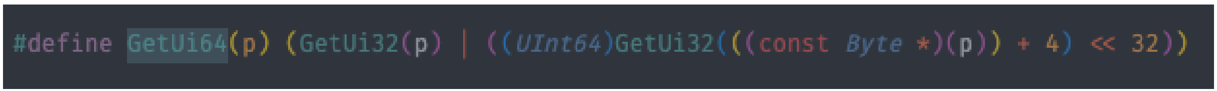


```
american fuzzy lop ++4.07a {variant-afl-asan} (.../Alone2/_o/bin/7zz) [fast]
┌─ process timing ────────────────────────────────────┬─ overall results ────┐
│        run time : 2 days, 13 hrs, 13 min, 13 sec    │  cycles done : 1     │
│   last new find : 0 days, 0 hrs, 10 min, 37 sec     │ corpus count : 6737  │
│last saved crash : none seen yet                     │saved crashes : 0     │
│ last saved hang : 0 days, 1 hrs, 15 min, 58 sec     │  saved hangs : 46    │
├─ cycle progress ─────────────────────┬─ map coverage┴──────────────────────┤
│  now processing : 5762*0 (85.5%)     │    map density : 7.40% / 23.60%    │
│  runs timed out : 0 (0.00%)          │ count coverage : 5.53 bits/tuple   │
├─ stage progress ─────────────────────┼─ findings in depth ─────────────────┤
│  now trying : trim 512/512           │ favored items : 667 (9.90%)        │
│ stage execs : 112/290 (38.62%)       │  new edges on : 1292 (19.18%)      │
│ total execs : 4.64M                  │ total crashes : 0 (0 saved)        │
│  exec speed : 5.56/sec (zzzz...)     │  total tmouts : 108 (0 saved)      │
├─ fuzzing strategy yields ────────────┴─────────────┬─ item geometry ───────┤
│   bit flips : disabled (default, enable with -D)   │    levels : 6         │
│  byte flips : disabled (default, enable with -D)   │   pending : 3259      │
│ arithmetics : disabled (default, enable with -D)   │  pend fav : 1         │
│  known ints : disabled (default, enable with -D)   │ own finds : 1235      │
│  dictionary : n/a                                  │  imported : 4815      │
│havoc/splice : 422/552k, 813/2.08M                  │ stability : 69.98%    │
│py/custom/rq : unused, unused, unused, unused       ├───────────────────────┘
│    trim/eff : 8.06%/1.95M, disabled                │          [cpu001:100%]
└────────────────────────────────────────────────────┘
```

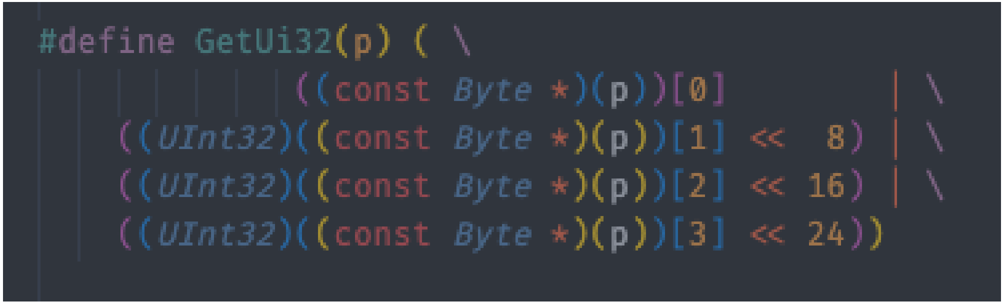
Static Analysis

We ran the codebase through the static analysis tool cppcheck, which tagged 1569 warnings and errors. One of the common errors flagged by cppcheck was shiftTooManyBits

Unfortunately, when looking at the actual source code, almost all of these errors come from an innocuous function:

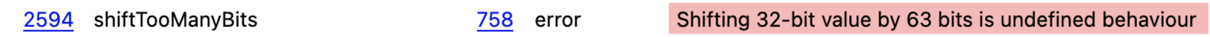


```
#define GetUi64(p) (GetUi32(p) | ((UInt64)GetUi32(((const Byte *)(p)) + 4) << 32))
```

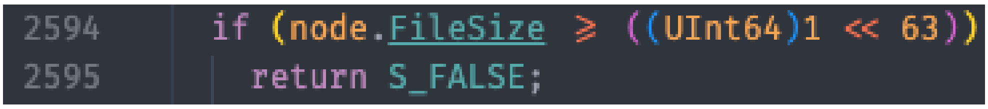


```
#define GetUi32(p) ( \
             ((const Byte *)(p))[0]        | \
    ((UInt32)((const Byte *)(p))[1] <<  8) | \
    ((UInt32)((const Byte *)(p))[2] << 16) | \
    ((UInt32)((const Byte *)(p))[3] << 24))
```

The rest, on closer inspection, are also falsely flagged as errors, such as this one:

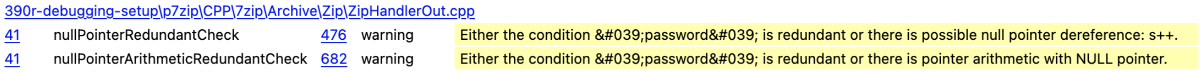


2594	shiftTooManyBits	758	error	Shifting 32-bit value by 63 bits is undefined behaviour



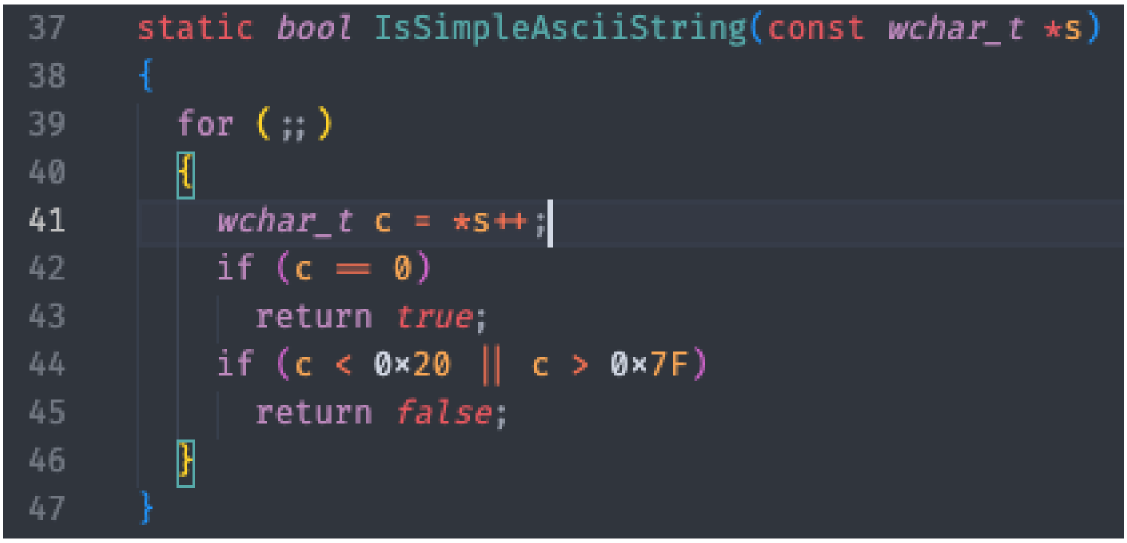
```
2594    if (node.FileSize >= ((UInt64)1 << 63))
2595      return S_FALSE;
```

A more promising error seems to be a possible null pointer exception:



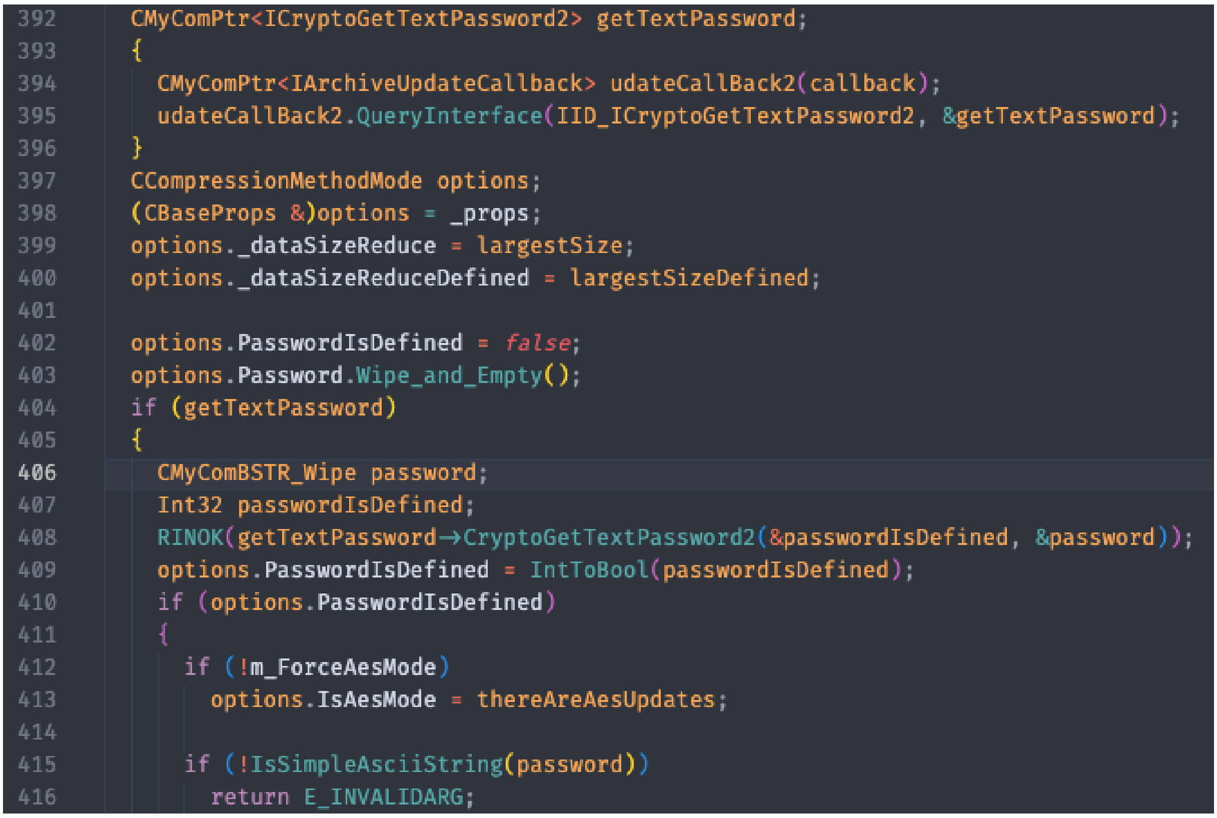
390r-debugging-setup\p7zip\CPP\7zip\Archive\Zip\ZipHandlerOut.cpp

41	nullPointerRedundantCheck	476	warning	Either the condition &#039;password&#039; is redundant or there is possible null pointer dereference: s++.
41	nullPointerArithmeticRedundantCheck	682	warning	Either the condition &#039;password&#039; is redundant or there is pointer arithmetic with NULL pointer.



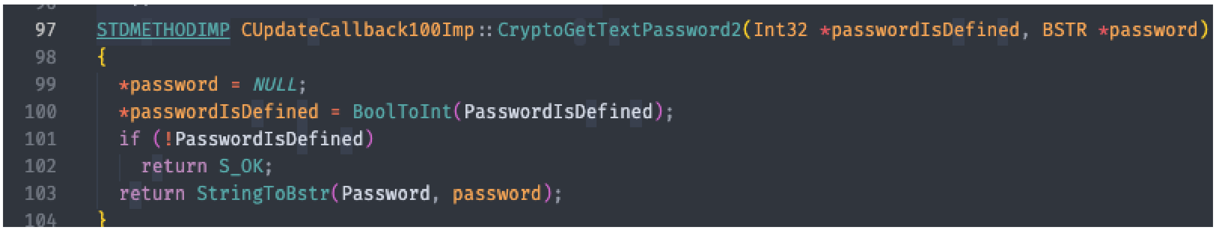
```
37  static bool IsSimpleAsciiString(const wchar_t *s)
38  {
39    for (;;)
40    {
41      wchar_t c = *s++;
42      if (c == 0)
43        return true;
44      if (c < 0x20 || c > 0x7F)
45        return false;
46    }
47  }
```

This function is only called once, in the same file at line 415:

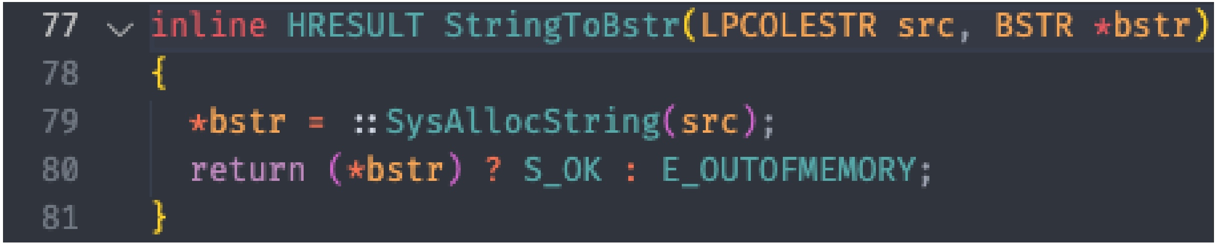


```
CMyComPtr<ICryptoGetTextPassword2> getTextPassword;
{
  CMyComPtr<IArchiveUpdateCallback> udateCallBack2(callback);
  udateCallBack2.QueryInterface(IID_ICryptoGetTextPassword2, &getTextPassword);
}
CCompressionMethodMode options;
(CBaseProps &)options = _props;
options._dataSizeReduce = largestSize;
options._dataSizeReduceDefined = largestSizeDefined;

options.PasswordIsDefined = false;
options.Password.Wipe_and_Empty();
if (getTextPassword)
{
  CMyComBSTR_Wipe password;
  Int32 passwordIsDefined;
  RINOK(getTextPassword->CryptoGetTextPassword2(&passwordIsDefined, &password));
  options.PasswordIsDefined = IntToBool(passwordIsDefined);
  if (options.PasswordIsDefined)
  {
    if (!m_ForceAesMode)
      options.IsAesMode = thereAreAesUpdates;

    if (!IsSimpleAsciiString(password))
      return E_INVALIDARG;
```

It looks like `password` gets populated in `CryptoGetTexPassword2`, looking at that function, and the subsequent call to StringToBstr, it unfortunately looks like the nullpointer is properly checked for.



```
STDMETHODIMP CUpdateCallback100Imp::CryptoGetTextPassword2(Int32 *passwordIsDefined, BSTR *password)
{
  *password = NULL;
  *passwordIsDefined = BoolToInt(PasswordIsDefined);
  if (!PasswordIsDefined)
    return S_OK;
  return StringToBstr(Password, password);
}
```



```
inline HRESULT StringToBstr(LPCOLESTR src, BSTR *bstr)
{
  *bstr = ::SysAllocString(src);
  return (*bstr) ? S_OK : E_OUTOFMEMORY;
}
```