VS Code + GDB/CUDA-GDB/LLDB

Installation

- VS Code
- Docker (optional)
- GDB/CUDA-GDB/LLDB
    - If not installed in the default path, the customized path can be specified in the configuration file (.vscode/launch.json)
- Extensions:
    - C/C++ (Extension Pack)
    - CodeLLDB
    - Nsight Visual Studio Code Edition

Configure (.vscode/launch.json)

```
{
  "name": “Demo",
  "type": "cppdbg",
  "miDebuggerPath": "/usr/local/cuda/bin/cuda-gdb",
  "cwd":"/PATH/TO/DIRECTORY/",
  "request": "launch",
  "program": "/PATH/TO/PROGRAM",
}
```

Demo introduction

- Task: convert English sentences to token IDs.
  - Example (bert tokenizer): “Hello world!” → “101 7592 2088 999 102”
- Code: mix of C++ code and CUDA code
- Debug
  - Compile the code in the debug mode

```
$: cmake -DCMAKE_BUILD_TYPE=Debug ..
$: make dbg=1 -j
```

  - Set breakpoints
  - Debug with GUI or commands

```
$: -exec info shared
$: -exec bt
$: -exec info args
$: -exec p num_code_points
$: -exec set $n = num_code_points + 1
$: -exec p $n
$: -exec cuda thread
```

Reference

- https://sourceware.org/gdb/current/onlinedocs/gdb.pdf
- https://lldb.llvm.org/use/map.html
- https://docs.nvidia.com/cuda/cuda-gdb/index.html#memory-and-variables
- https://docs.nvidia.com/nsight-visual-studio-code-edition/cuda-debugger/index.html