# ATAD | Debugging in VS Code with GDB

This assumes you have all the required software packages installed. See installation notes if not sure (other file).

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**Important**: If you have *cloned* the `CProgram_Template` project, then you can ignore the "Manual set up" section.

## Example program

Consider the following program in `main.c` (the line no. 9 is identified. You'll need it later on).

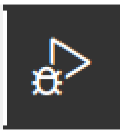
```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

int main() {

    char str[30] = "Debugging in VS Code";

    int i = 0; //Line 9
    while(str[i] != '\0') {
        printf("%c\n", str[i]);

        i++;
    }
    printf("Done!");

    return EXIT_SUCCESS;
}
```

### Debugging procedure example

1. Considering the previous program, place a *breakpoint* at line 9 (click with the mouse right beside the line number). You should now see a persistent red circle. This indi-

cates that, when debugging, the program will stop here and you'll have control of the program flow afterwards.

2. Open the **Run and Debug** tab (left side, see image below):

3. You should now see a green play icon at the top beside "gdb - Debug project". Click on it and the debug will start.

   - This will call `make debug` automatically and run `gdb` over the `prog` executable.

4. In the **Variables** panel you can see the current values of `str` (all the positions of the array) and `i`. The variable `i` is not yet initialized, because this instruction at line `9` hasn't been executed yet!
5. Add the expression "`str[i]`" to the **Watch** list, before continuing;
6. Now use the **Step Over (F10)** command to proceed line by line, watching the values change as the program executes.

## Manual set up

> This is only required for an empty or existing project.

The following steps must be complete in order to debug programs interactively inside Visual Studio Code.

Your `makefile` should look like this (the important part is the usage of the `-g` flag; this will include debug symbols in the executable):

```
default:
    gcc -Wall -o prog main.c
debug:
    gcc -Wall -o prog -g main.c
clean:
    rm -f prog
```

Please note that the executable file in all cases is named `prog`.

Go ahead and compile the program with the `make` command, invoking the `debug` directive:

```
$> make debug
```

## Configuring debugging in VS Code

You must produce the following steps to ensure the correct usage of *gdb* inside *vs code*, together with all the nice interactive features:

1. Create a folder named `.vscode` within you *working directory*.
2. Create and copy the contents for the following files:

`tasks.json`

```
{
    "tasks": [
        {
            "type": "cppbuild",
            "label": "C/C++: call make debug",
            "command": "/usr/bin/make",
            "args": [
                "debug"
            ],
            "options": {
                "cwd": "${workspaceFolder}"
            },
            "problemMatcher": [
                "$gcc"
            ],
            "group": {
                "kind": "build",
                "isDefault": true
            },
            "detail": "Task generated by Debugger."
        }
    ],
    "version": "2.0.0"
}
```

### launch.json

```
{
    "version": "0.2.0",
    "configurations": [
        {
            "name": "gdb - Debug project",
            "type": "cppdbg",
            "request": "launch",
            "program": "${workspaceFolder}/prog",
            "args": [],
            "stopAtEntry": false,
            "cwd": "${workspaceFolder}",
            "environment": [],
            "MIMode": "gdb",
            "setupCommands": [
                {
                    "description": "Enable pretty-printing for gdb",
                    "text": "-enable-pretty-printing",
                    "ignoreFailures": true
                }
            ],
           /* This calls the debug task in "tasks.json" prior to debugging */
            "preLaunchTask": "C/C++: call make debug",
            "miDebuggerPath": "/usr/bin/gdb"
        }
    ]
}
```

## Author and support

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You should ask your PL teacher for any help regarding these contents and procedures.