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# How to compile assembly code for games on the Atari 2600

Johni Douglas Marangon · [Follow](#)

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Hello everyone, I'm really excited to write this post because it is nostalgic for me. The Atari 2600 was my first video game system and I remember almost in details the emotion that was playing games there. The sound and graphics of the games were really fantastic and transports me to the past. I had so much fun with this machine.

This article was written to take a look at the basic tools to compile and run Atari 2600 games in the emulator. Afterwards we'll use the open source code from some popular games to test it.

So, if you want to write a program to run in the processor 6502 with assembly code — used by Atari 2600 — here you will learn how to start. If you remember having a good time playing Atari games this post is for you.

Hope you enjoy and have fun.

## Install Stella emulator

The first tool you need to install is the emulator. [Stella](#) is an open source emulator multi-platform for Atari 2600. Read more about [Stella history](#).

Go to the [download page](#) and choose the correct version to your operating system — Linux, Mac or Windows — download and install to the appropriate OS system version.

For debian-based linux just run the command below:

```
sudo apt-get install stella
```

Once Stella is installed, you are able to open the emulator and load the game image (aka ROM). Type `stella` on the prompt. I encourage you to take a look at this [user's guide](#).

## Install dasm 8-bit macro assembler

[dasm](#) is a macro assembler used to assemble binary data for 8-bit microprocessors like MOS 6502 used by Atari. This is a great tool for coding demos on the Atari 2600. Download the [latest version of dasm](#) and install for your operation system.

For debian-based linux use the command below:

```
sudo apt-get install dasm
```

As an example, consider that the file `mygame.asm` contains the assembly code, the command below is used to assemble the `asm` file to a binary file:

```
dasm mygame.asm -o mygame.bin -f3
```

The name of the source code and the binary file is the same `mygame`. The `-o` tells DASM which name will be used for the output, `-ofilename`. The output format used is `-f3`. It indicates the output file contains data only without header information. For more details about the commands, please take a look at the [documentation](#).

If you use VS Code you can use a extension [dasm macro assembler](#) to make things easier.

## Compile the Assembly Code

We are ready to assembly a game. I chose the game Gene Medic. Gene Medic is a [homebrew game](#) and you can know more about it accessing the [official page](#).

If you have the source code of other games you can use it in this step. I have a [GitHub respository](#) with some assembly codes, feel free to use anyone them.

Use the following commands in sequence to assembly and run the game with Stella.

```
mkdir genemedic
cd genemedic

wget https://atariprojects.org/wp-content/uploads/2019/01/macro.h
wget https://raw.githubusercontent.com/johnidm/asm-atari-2600/master/vcs.h

wget https://raw.githubusercontent.com/moorejh28/genemedic/master/genemedic.asm

dasm genemedic.asm -ogenemedic.bin -f3
```

vcs.h and macro.h are two important files that include some important assembly macros. Same assemblies code will eventually need these files.

Once the assembler is finished, you should be able to load the binary produced into the Stella emulator with the command below:

```
stella genemedic.bin -fullscreen 1
```

## **Stella keyboard controller**

The Atari 2600 console controls are mapped to the computer's keyboard as following:

- **Escape** – Exit game mode/enter launcher mode
- **F1** – Select Game
- **F2** – Reset Game
- **Up arrow** – Joystick up
- **Down arrow** – Joystick down
- **Left arrow** – Joystick left
- **Right arrow** – Joystick right
- **Space** – Fire button

Those are all commands that you need to know to play the games.

## **Running an existing ROM file**

If you search the internet probably you are find a lot of ROMs from the classical games to run in Stella. Two interesting places to find games are [AtariMania](#) and [My Abandonware](#). So, just download the game ROM and run with Stella.

Let's play the [Keystone Kapers](#) game using a ROM:

```
wget https://raw.githubusercontent.com/johnidm/asm-atari-2600/master/ROMs/Keysto  
stella Keystone-Kapers.bin -fullscreen 1
```

Before open the ROM with Stella press F2 and enjoy it.

## Resources

Here is a list of resources to know more about the current Atari ecosystem:

- [Online Development IDE](#)
- [AtariAge](#)
- [Atari Memories](#)
- [The Harmony Cartridge](#)
- [batari Basic language](#)
- [8Blit Youtube channel](#)
- [The Online Atati 2600 emulator](#)

## Conclusion

Recently, I decide to learn assembly as a hobby an my goal is to write a program to run in Atari 2600 emulator. I will be happy if I can build a hello-word program. This is not an easy task but I accept this challenge.

See you to next post!

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## Written by Johni Douglas Marangon

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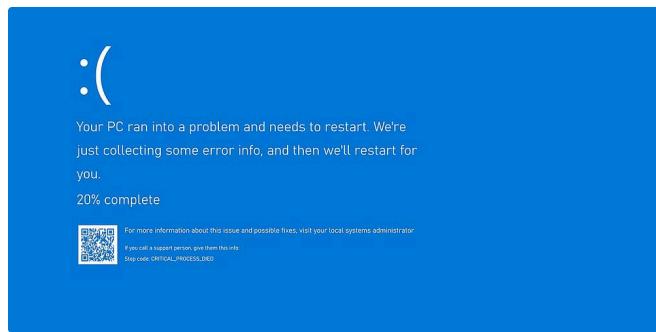
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```
[~/dev/.:/] $ ./image=sha256 docker build . -t image-example:v1.0
[+] Building 6.6s (6/6) FINISHED
=> [internal] load build definition from Dockerfile          0.0s
=> => transferring dockerfile: 99B                          0.0s
=> [internal] load .dockerignore                           0.0s
=> => transferring context: 2B                           0.0s
=> [internal] load metadata for docker.io/library/ubuntu:20.04 2.8s
=> [auth] library/ubuntu:pull token for registry-1.docker.io 0.0s
=> [1/1] FROM docker.io/library/ubuntu:20.04@sha256:f2034e7195f61334e 3.55s
=> => resolve docker.io/library/ubuntu:20.04@sha256:f2034e7195f61334e 0.0s
=> => sha256:d2034e7195f61334e6caff6e2cf2e9f5d02d11e88 1.13KB / 1.13KB 0.0s
=> => sha256:000169816638e6f063d3903434565624287828efcd06 424B / 424B 0.0s
=> => sha256:fde9c12d7df393f656d545c36391de434bbbe311 2.32KB / 2.32KB 0.0s
=> => sha256:d519a3a2a796a075e4ade05c4a513aa8dbf8 25.97MB / 25.97MB 2.6s
=> => extracting sha256:d519a3a2a796a075e4ade05c4a513aa8dbf8fdf0096 0.75s
=> exporting to image                                     0.0s
=> => exporting layers                                    0.0s
=> => writing image sha256:d8a65fa49a430cf0e155251a5c4668a24d91e86c1e 0.0s
=> => naming to docker.io/library/image-example:v1.0        0.0s
```



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