Menuet OS

An Operating System

Case Study

In Partial Fulfillment of the
Requirements in the course ITE1

By:

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I. Background of the Menuet OS

A. BRIEF HISTORY

The milestone comes after almost a decade and a half of development for the operating system, which despite having an impressive graphical user interface is still compact enough to fit on a floppy disk (assuming you can find one).

Ville Turjanmaa the creator and project leader, other contributors to Menuet have included Mike Hibbett, Jarek Pelczar, Mike Hibbett, Madis Kalme and Tom Tollet.

According to Ville Turjanmaa one of the things that kept him motivated during the lengthy development process was the chance to work on an area that "doesn't have pre-existing answers".

"And with Menuet, we have the opportunity to explore these uncharted areas," he said. "So it mainly boils down to curiosity."

"We've already managed to overcome many obstacles and so-called 'impossible' challenges," he added.

Hibbett, who headed up work on networking, said one of the aspects of Menuet's development he's proudest of is building a functional TCP/IP stack and Ethernet driver set in assembler.

"But equally [I'm proud of] building and working with a wonderful team of hackers around the world — some as young as 10 years' old!"

"I'm happy about how well all the individual components work together," Turjanmaa said when asked if there were any parts of Menuet he was especially proud of.

B. OBJECTIVE

"Menuet's primary goal was to write an operating system 100 per cent in assembly for faster code execution and smaller memory use," Turjanmaa said. "And with 1.00, I believe we've accomplished this goal."

"Another goal was to include all the common features, which we would expect from a modern operating system," he added.

"So Menuet's pre-emptive kernel runs stable and is suitable for tasks including precise timing and machine control," Turjanmaa said.

C. CURRENT STATUS (versions, on-going developments/upgrades)

Versions of the Menuet OS

- 23.03.2017 M64 1.25.10 released - Improved Calculator-app (more functions, 64bit fp)
- 25.02.2017 M64 1.24.80 released - Improved USB webcam support
- 17.10.2016 M64 1.23.90 released - Support for 32 GB of Ram
- 16.05.2016 M64 1.22.50 released - Improved SMP support (upto 32 processors)
- 18.04.2016 M64 1.21.20 released - Support for time-critical, non-preempting processes
- 24.01.2016 M64 1.15.50 released - Context mixing compressor by Akos Mogyorosi
- 17.09.2015 M64 1.05.70 released - WebCall (IP to IP with audio and video)
- 26.06.2015 M64 1.02.20 released - Streaming movie and audio support
- **15.05.2015 Menuet 64bit v1.00 released!**
- **17.04.2015 M64 MediaPlayer v1.00 released!**
- 19.01.2013 M64 0.98X released - Mathlib based on Naoki Shibata's SLEEF-library
- 25.06.2011 M64 0.96X released - IntelHDA (ALC662) audio driver
- 01.06.2011 M64 0.96P released - Intel Pro/1000 and Realtek 816x/811x drivers from Ian Seyler
- 12.10.2010 M64 0.94H released - **Fourier transform**, sinc and resampler from A.Mogyorosi
- 24.06.2010 M64 0.94B released - More supported TV-tuners & MPlayer 0.51
- 10.01.2010 M64 0.92H released - **Digital TV support** (dvb-t)
- 20.08.2009 M64 **MediaPlayer** by V.Turjanmaa & A.Mogyorosi
- 20.02.2015 **M32 - 0.86 released**

On-going development

Looking beyond the latest version 1.25, Turjanmaa said the team would look at improving the applications available for the OS.

"For version 2.0 we'll mostly keep improving different application classes, which are already present in 1.25," he said.

D. SCOPE OF DISTRIBUTION/ USAGE

-Menuet OS is free for personal and educational use.
-For commercial use you have to contact menuetos.net.
-Redistribution, reverse engineering, disassembly or decompilation is prohibited without permission from the copyright holders.

-There are no data on the number of current users of the Menuet OS or the number of downloads.

-Menuet OS is for hobbyists, for people interested in assembly language and for people who wants to learn assembly language.

II. Overview of the Menuet OS

A. SYSTEM REQUIREMENTS (Compatibility and interoperability)

-Minimum System Requirements for Menuet OS

- CPU: Pentium 90.
- RAM: > 32 MiB (24 MiB by tweaking)
- Videocard: VESA 2.0 compatible.
- Storage: 1.44" floppy drive.

-For research purposes you can run Menuet OS in Virtual Box by Oracle which is a lot safer but responsiveness is reduced because you will need more ram and more processing power.

-Menuet can be run using cd, you will need PC or laptops with optical drive. Menuetos.net provides windows installer of menuet os to cd, after installing you will need to change the boot priority to CD-drive to boot Menuet OS.

-Booting from a USB is not yet applicable because menuet os requires different file system which is fat12. There are users who were able to boot menuet os from USB drive but requires a lot of process and can be dangerous because it can ruin your files if not done properly.

B. SCOPE OF CAPABILITIES

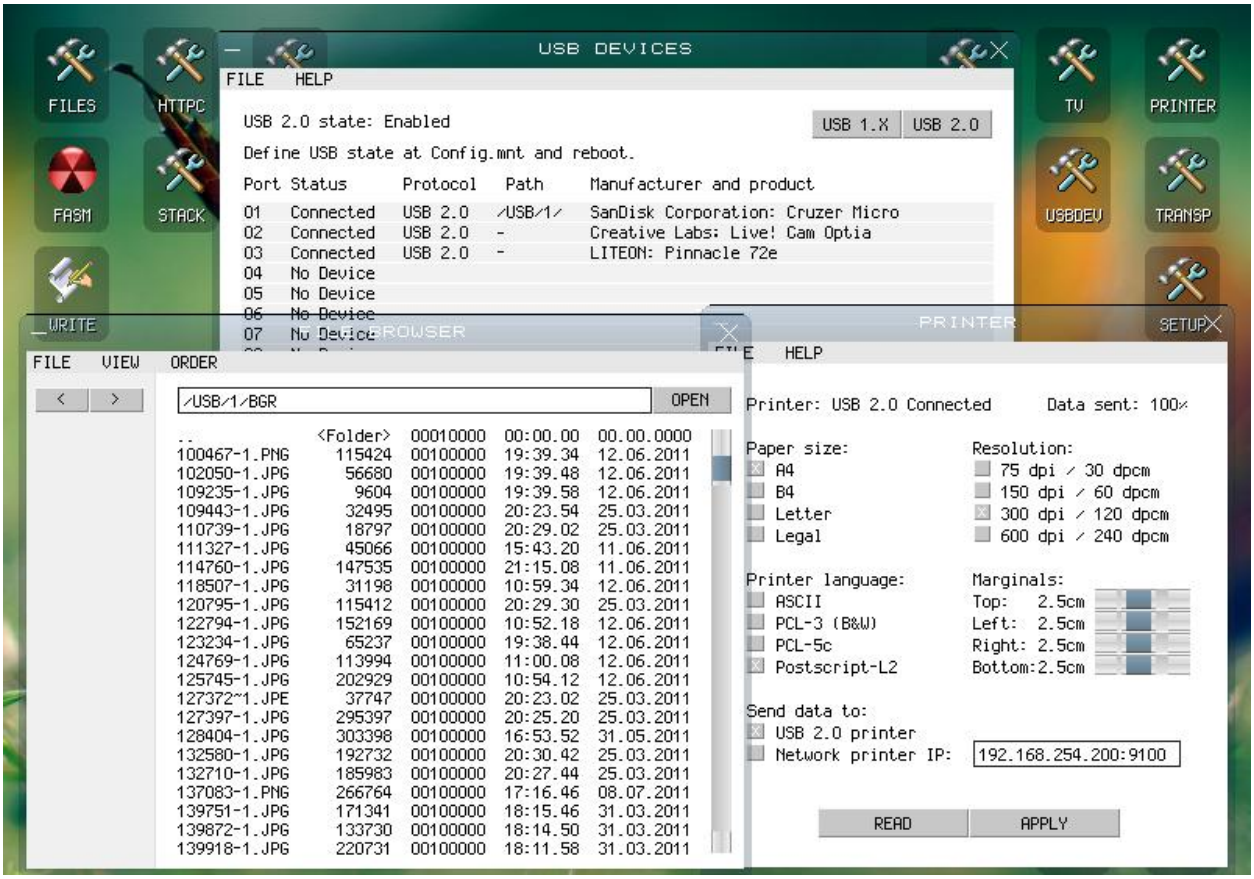
1. Human-computer interface

Tour of UI, Graphics and Directories

*The desktop is very minimalistic, upon installation icons are arranged where productivity applications are placed in the top left of the desktop, multimedia applications placed in top right and games Doom and Quake placed bottom right of the desktop.

*Accessing the files by opening the Files icon and there you will see the directories on the left part, files are listed in

the right with filename, memory address, the size of the file and the date it was modified. You can set the view of files into icon by clicking View then select Image so that it will show only file icons and the name.



*Menuet OS does not have mouse click, drag capabilities, no keyboard shortcuts like ctrl c,a,v and more. If you want to delete, move, or copy a file you have to use the command prompt.

*Right click and Left click functions as the same. You can change the settings on how you can open the applications if you want single click or double click.

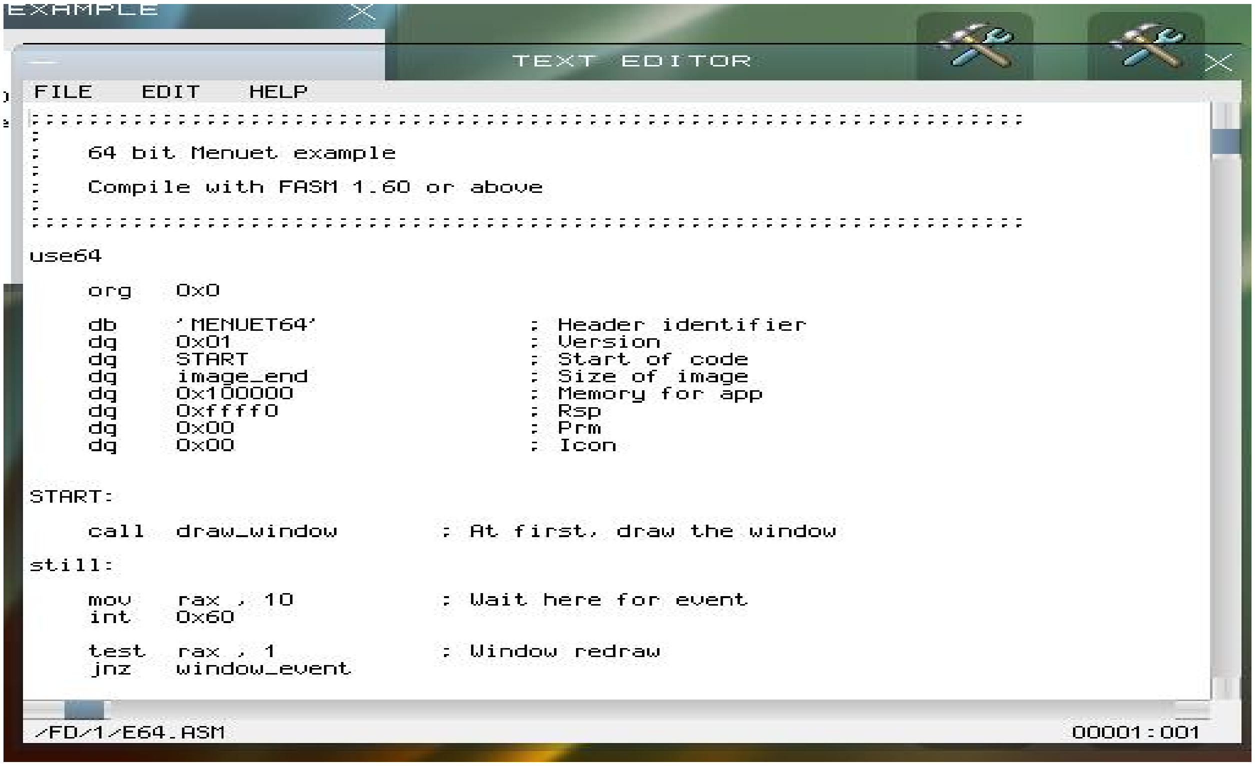
*There are icons in the menu that are similar to each other but they have descriptions and some are abbreviated which you have to be familiar with.

*Menuet supports 16 millions of colors even it is a small sized operating system it can run simple graphics.

2. Office Productivity Tools

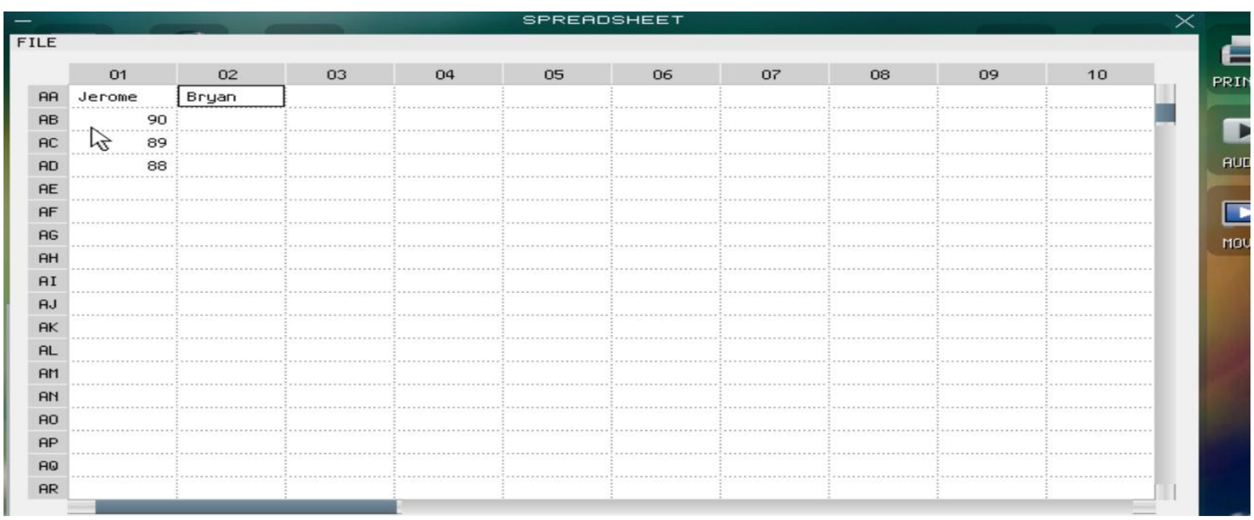
- **Write or Text Editor**

  The same with Windows notepad but a little complicated to use. You can create simple programs and save it as .ASM.



- **Spreadsheet or MSS in the menu**

It does not support data calculations. You can only store data in rows and columns.

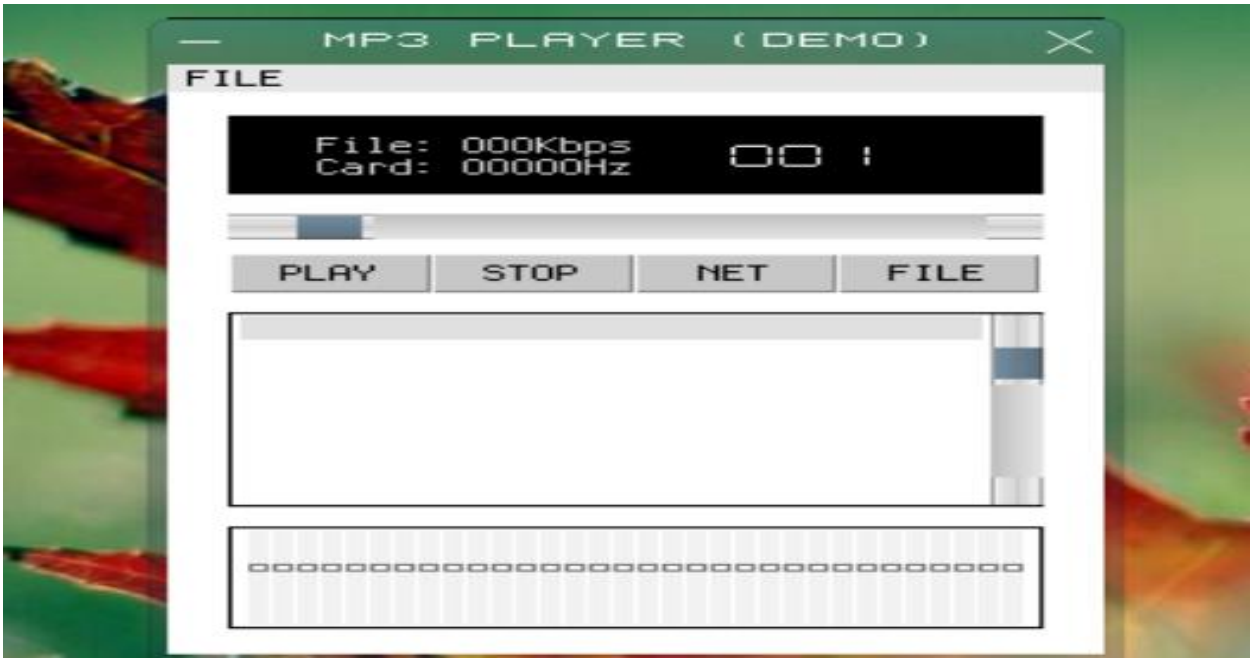


- **HTTPC**
  Web browser but no flash player.

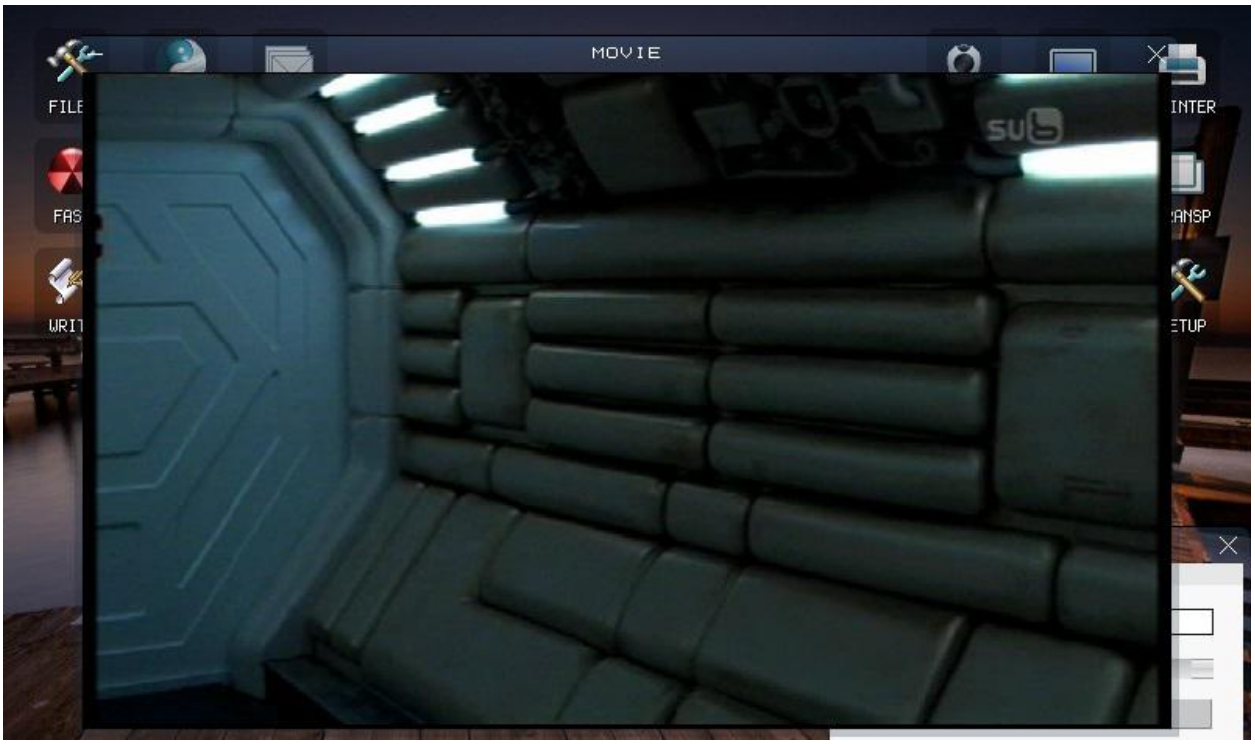
3. Multimedia Capabilities

TV/Radio

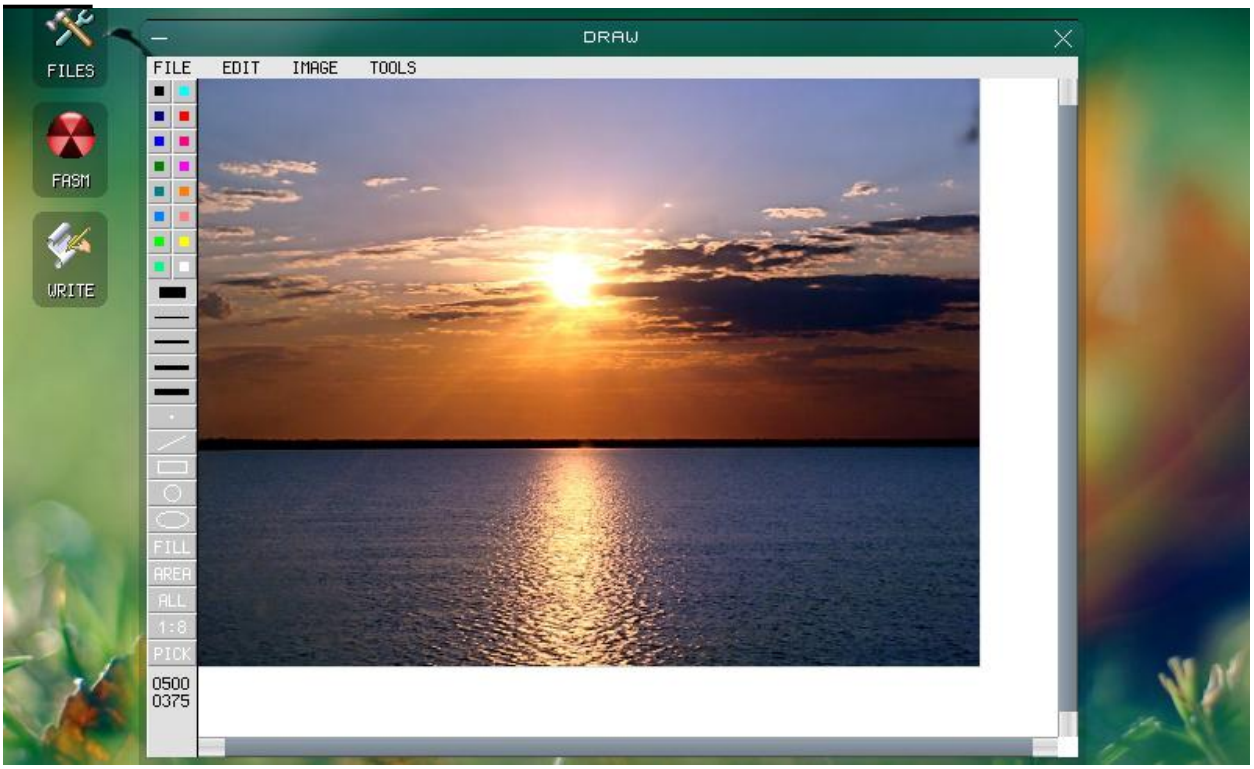
Audio/ MP3 Player



Movie



Draw

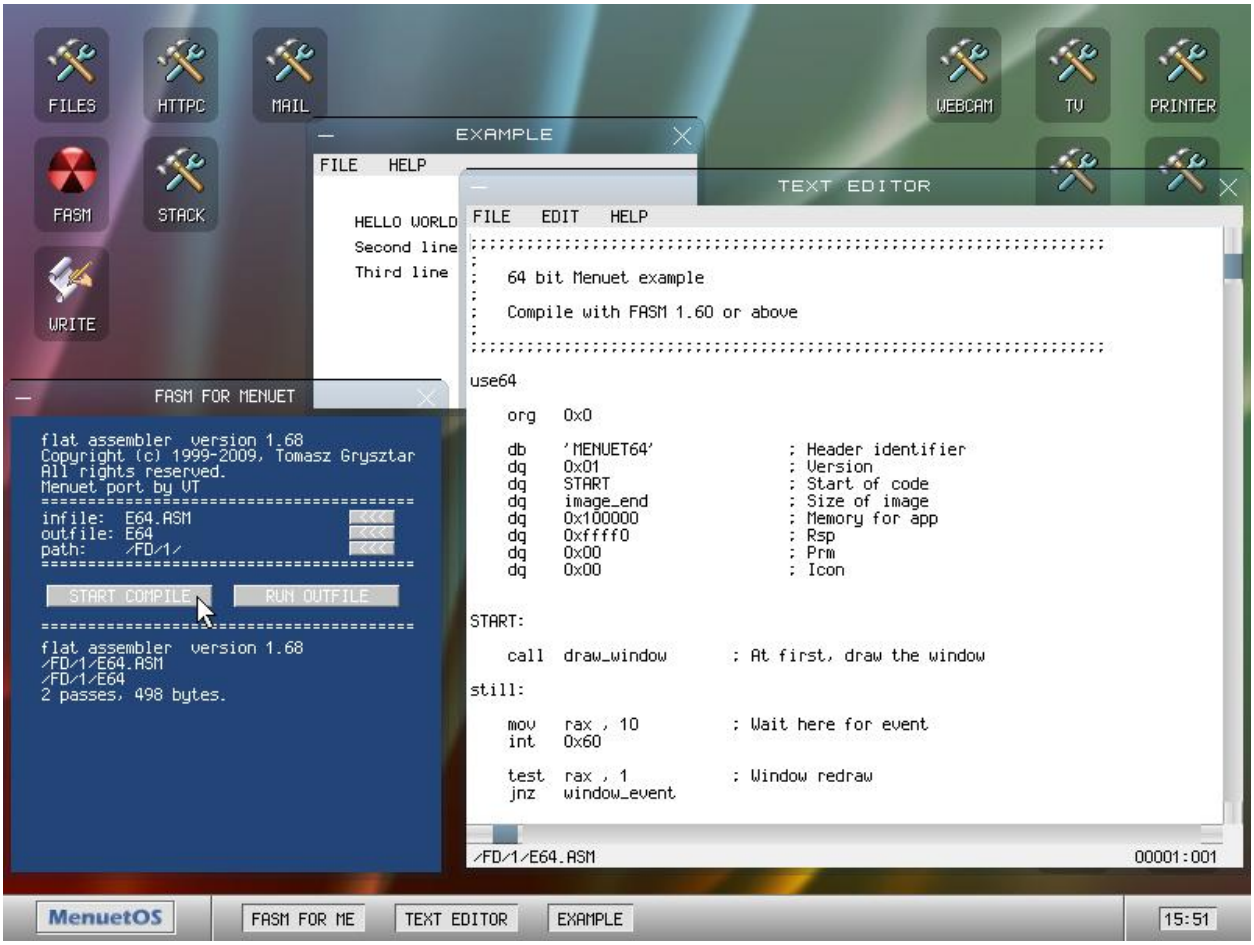


SDL Quake

4. Ease of Application Development

-You can create programs in assembly language which is in TASM but creating a simple program like “Hello World” requires many lines of codes.

-Programs is written in Text editor. It is complied and run using the FASM application.



5. Ease of Maintenance

You can save your machine state if you are running Menuet OS in virtual box.

Saving your files in local drive when running in virtual box is not possible because it cannot detect your virtual drive. You can save your files in USB flash drive if it is compatible and USB version 2.0.

6. Limitations

- No wifi support, you will need to connect to internet via Ethernet.
- No wireless/Bluetooth support.
- If you are running Menuet OS in virtual box you will not be able to access your local files.
- Using the demo version of Menuet OS limits you to using the multimedia applications TV/Radio,DVD Movie player,MP3 player, but if you agree to the license, the decoder is available for purchase at Avangate for $10.66, after purchase they will send the decoders and the instructions to your e-mail so you can fully use the media players.
- All programs only comes from the developers, you cannot install programs.
- You cannot choose your own background picture only the image files provided in the MenuetOS.net are the ones that can work as a background picture for your desktop.

C. SECURITY FEATURES

No administration feature, no account or logon with password feature in this operating system.

III. Special Features

A. UNIQUE FEATURES AND CAPABILITIES

- Pre-emptive multitasking with 1000hz scheduler, multiprocessor, multithreading, ring-3 protection
- Responsive GUI with resolutions up to 1920x1080, 16 million colours
- Free-form, transparent and skinnable application windows, drag'n drop
- SMP multiprocessor support with up to 32 cpus
- IDE: Editor/Assembler for applications
- USB 2.0 HiSpeed Classes: Storage, Printer, Webcam Video and TV/Radio support
- USB 1.1 Keyboard and Mouse support
- TCP/IP stack with Loopback & Ethernet drivers
- Email/ftp/http/chess clients and ftp/mp3/http servers
- Hard real-time data fetch
- Fits on a single floppy, boots also from CD and USB drives

B. UNIQUE APPLICATIONS

It has TV/Radio application, you need a digital box to run to be able to watch.

It has retro style games like Pacman, Space Invaders, it also has the first version of the games Doom and Quake.

C. ADVANTAGES AND DISADVANTAGES OF USING MENUET VS MAINSTREAM OS

Advantages of Menuet OS vs Mainstream OS

-Menuet OS is super lightweight, it has the smallest size with 1.44 mb that can fit in floppy disk.

-Fast, lags and bugs are minimal.

-Learning assembly language or language of the processor, next to machine code is a great skill.

-Menuet OS can be organized in a folder and it does not come with unnecessary files or directories.

Disadvantages of Menuet OS vs Mainstream OS

-Menuet os must have folders with drivers available, and a better window in-text mode to choose drive that you want to use.

-Drivers must be compiled and possible of installing in real time without having that to recompile the kernel.

-It is lacking an equal application windows to explorer, with basic functions as to go up a level, exclude, create folder, rename, organize, show miniature, shortcuts and ability to open HTML files.

-Menuet OS does not support multiple drives yet.

-No wireless support.

IV. Conclusion

A. SUPPORT AND ON-GOING ENHANCEMENTS

For questions, recommendations and suggestions you can contact the developers through their e-mail.

-Ville Turjanmaa-vmt[@]menuetos[.]net
-Madis Kalme-madis[@]menuetos[.]net
-Tom Tollet-tom[.]tollet[@]menuetos[.]be

Menuet OS has two forums

yuku.com- For programming and general questions about Menuet.
Board.flatassembler.net/forum- For assembly programming questions.

B. AREAS OF IMPROVEMENT

-Not future proof. It doesn't use a standard Linux window manager. It has its own custom one. MenuetOS is entirely written in assembly, they should apply other languages, but according to the forum that’s the whole point of the menuet os.

-Better compatibility with other devices like usb mouse, usb keyboard.

-Compatibility in Virtual box, so that people who want to try this OS can use it with no problem or else they will be discouraged because of difficulty in configuring the Menuet OS.

-Better user interface, add mouse right click function.

-Add keyboard shortcuts.

-Add ability to close application in the tab.

-More icon for each applications.

C. REFERENCES

Menuetos.net/forum.htm

Developers.slashdot.org

Computerworld.com.au

ubuntuforums.org

Goodgearguide.com.au

V. Installation

*Instructions

We recommend running Menuet os in Virtual box, we have included Virtual Box installer in the sd card and the Menuet latest

version image file. But if you want to fully experience Menuet OS and you meet the requirements for the BIOS and your CD burning application recognizes el-torito, you can try method 2.

Method 1- Run Menuet using virtual box

Instructions:

1) Run VirtualBox-5.1.18-114002-Win and install.

2) Open Virtual Box and select "New".

3) Type the name of the Virtual Machine, select "Other" for the Type, select Other/Unknown (64-bit) for the Version.

4) Adjust memory size to 512 mb.

5) Select "Do not add a virtual hard disk" then click Create.

6) Select Setting then go to Storage, add new storage controller and select "Add Floppy Controller".

7) Click on Adds floppy drive, select Choose disk and locate M6412510.img file on the SD card.

8) Click Ok and start your machine.

Note that this settings might not work on your system. If you encounter memory error then try adjusting the base memory. In other case changing the Type and Version to linux fixes the problem.

Note: This method can be dangerous, we advise you to use different laptop if you do not want to lose your files.

Method 2- Install and boot using CD

Important: Make sure that your Bios fully supports the el-torito cd format.

Incompatible bios versions include:
- Phoenix Award Bios v6.00PG
- Insyde BIOS with Intel Macs

Bootable CD instructions:

1.) Unzip isohdr.zip and 1.4MB Menuet image.

2.) Combine the ISO-header with Menuet image

```
Dos:  copy /b isohdr + MenuetImage.img mboot.iso
Unix: cat isohdr MenuetImage.img > mboot.iso

Resulting mboot.iso size: 1527808 bytes.
```

3.) Burn mboot.iso to CD and boot

CD burning application should recognize the used 'el-torito cd' format.

Note that the CD image is for booting only and does not include a ISO9660 filesystem.