gsm

COLLABORATORS			
	TITLE : gsm		
ACTION	*NAME*	*DATE*	*SIGNATURE*
WRITTEN BY		November 23, 2024	

REVISION HISTORY			
NUMBER	DATE	DESCRIPTION	NAME

Contents

Chapter 1

gsm

1.1 Contents

```
GSM - Graphic System Monitor  V 1.3


GSM shows a graphical display of memory usage, memory fragmentation and
CPU usage.


Table of Contents:


 Introduction
 Copyright and Disclaimer

 System Requirements
 Installation
 Use from Workbench
 Use from Shell
 Tool Types

 Features
 Menus

 Bugs
 Future
 History
 Author
 GSM Info Page

------------------------------------------------------------------------------

Quick Start:

Follow the Quick Start links if you want to use GSM quickly without
reading all of the guide.

Quick Start Link:  Installation
```

1.2 Copyright and Disclaimer

1.3 Introduction to GSM

Introduction to GSM

The Graphic System Monitor (GSM) is a system monitoring tool that shows graphically:
- Memory usage (both CHIP and FAST)
- Memory fragmentation
- CPU idle rate

I built GSM because I felt that there was no tool available that had all of these options. There are many free memory gauges, but these are just like fuel gauges, and don’t produce the nice "hartbeat" like graph I wanted. Some tools do make such a graph, but they don’t show all options at the same time.

Some tools measure CPU load or idle rate, but many do so in a terrible
inaccurate way (counting the number of READY tasks).
Very few tools show memory fragmentation, and those who do, present the
information in textual form, not graphically.

That's why I decided to build my own tool that shows everything I want
to see the way I want it to see.

GSM was inspired on the very old PerfMon tool by Dale Luck, but it has some
extra options. Besides, the PerfMon tool was developed for WB 1.x, and
looks ugly on a 2.x/3.x Workbench screen.

1.4 System Requirements

System Requirements

To successfully use GSM, you need:

 o An Amiga with Kickstart/Workbench 2.0 or later
 o A CPU and some memory ;-)

1.5 Installing GSM

Installing GSM

Well, there is not much to say about this.

Just copy the executable and this guide (and the icons) to where you want
them to be.
That's it.

GSM doesn't need third-party libraries, and doesn't need any Assigns.

 Quick Start Links: Use from Workbench
                     Use from Shell

1.6 Use GSM from Workbench

Use GSM from Workbench

GSM can be started from the Workbench like any other program: just double-
click on its icon.

You can set several Tool Types using the Workbench information
menu choice.

Alternatively, GSM can be started from the Shell .

 Quick Start Link: Features

1.7 Use GSM from the Shell

Use GSM from the Shell

GSM can be started from the Shell (or CLI).

```
Format:     GSM  [CHIP] [FAST] [CPU] [FRAG] [NOFRAG] [GRID] [NOGRID]
                 [DELAY delay] [WINDOW window_spec]
                 [PUBSCREEN screen_name]
                 [FONT font_name] [FONTH font_height]
                 [BGPEN pen] [FG1PEN pen] [FG2PEN pen]
                 [GRIDPEN pen] [TITLEBAR yes_or_no]

Template:   GSM  CHIP/S,FAST/S,CPU/S,FRAG/S,NOFRAG/S,GRID/S,NOGRID/S,
                 DELAY/N/K,WINDOW/K,PUBSCREEN/K,FONT/K,FONTH/N/K,
                 BGPEN/N/K,FG1PEN/N/K,FG2PEN/N/K,GRIDPEN/N/K,TITLEBAR/K
```

When started from the shell, GSM tries to read its Workbench icon file. It then uses the Tool Types in that file for its default configuration. The command line arguments can be used to override the Tool Type settings.

GSM supports the following command line arguments:

   CHIP
   FAST
   CPU
            If any of these three are present, they override all three
            of the corresponding Tool Types .

   NOFRAG
   NOGRID
   DELAY number_of_milliseconds
   WINDOW left/top/width/height
   PUBSCREEN Public_Screen_Name
   FONT=fontname.font
   FONTH=font_height
   BGPEN=pen_number
   FG1PEN=pen_number
   FG2PEN=pen_number
   GRIDPEN=pen_number
   TITLEBAR=yes_or_no
            The meaning of these arguments are the same as the
            corresponding Tool Types

   FRAG
            Can be used to override a NOFRAG Tool Type setting.

   GRID
            Can be used to override a NOGRID Tool Type setting.

Alternatively, GSM can be started from the Workbench .

Quick Start Link: Features

1.8 GSM's ToolTypes

GSM's ToolTypes

GSM can be configured using the Tool Types in its Workbench icon file.
Use the Workbench "Information" menu item to change them, or select the
GSM Save Settings menu item to save the current configuration.

The Workbench icon file is also read for the configuration when GSM was
started from the shell.

GSM supports the following ToolTypes:

CHIP
Display Chip memory usage .

FAST
Display Fast memory usage .

CPU
Display CPU idle rate .

If neither of the CHIP, FAST and CPU tooltypes are present, all three are
displayed. This is because it is rather silly to start GSM if you don't
want to see any of its displays.

NOFRAG
Do not display memory fragmentation .

NOGRID
Do not display a grid .

DELAY=number_of_milliseconds
Set the delay between display updates. The minimum delay
is 250 ms, the maximum is 5000 ms (5 seconds).
Default delay is 1 second.

WINDOW=left/top/width/height
Set the initial window dimensions .
Default window dimensions are 0/0/260/120.

PUBSCREEN=Public Screen Name
The name of the screen GSM should open its window on.
Default screen is the current default public screen (usually
the Workbench screen).

FONT=fontname.font
FONTH=font height
The font name and height to use for displaying text.
Default is the system's default font.

```
   BGPEN=pen number
   FG1PEN=pen number
   FG2PEN=pen number
   GRIDPEN=pen number
            The  pen numbers  to use for drawing the graphs.
            Default are the screen's background, text, highlight and fill
            pens, respectively.

   TITLEBAR=yes_or_no
            Open the window with or without  title bar .
            Default is to open with title bar.

GSM's tooltypes are not case-sensitive.
```

1.9 GSM Features

```
GSM Features

System information:
   o  Amount of free  chip memory  and optional  fragmentation  rate
   o  Amount of free  fast memory  and optional  fragmentation  rate
   o   CPU  idle rate
 * o   Difference  in free memory since some settable starting point

Other features:
   o  User control of the  speed  at which the graphs proceed
   o  Optional  grid  in the graph displays
   o  Fully resizeable  window
   o  Memory  flush  option
   o  Non-modal  About  requester
 * o  User settable  colors  for the graphs
 * o  User settable  font  to use for text
 * o  Window opens on any  public screen
 * o  Window opens with or without  title bar
 * o  Settings can be  saved  in the Workbench icon file

* These features are new for version 1.3

------------------------------------------------------------------------------

 Quick Start:
   There are no more Quick Start links.
   Click on any of the above to see more about that feature of GSM,
   or go back to  Installation .
```

1.10 GSM Menus

```
GSM Menus

The GSM Menus are layed out in the following way:
```

```
   Project
    Flush
    Flush & Remember
    ----------------
    Save Settings
    ----------------
    About...
    Quit


   Display
    Chip Memory
    Fast Memory
    Fragmentation
    CPU Idle
    -------------
    Grid
    -------------
    Title Bar

Click on an item to see more.
```

1.11 Flush Memory

```
Flush Memory

DESCRIPTION
   Flush memory from within GSM.
   All disk-based libraries, devices, fonts, etc that are no longer in use
   are removed from memory.

MENU SELECTION
   Project / Flush

KEYBOARD SELECTION
   Right-Amiga F
```

1.12 Flush Memory and Remember

```
Flush Memory and Remember

DESCRIPTION
   Memory is flushed like the  flush  function.
   The resulting amount of free memory is remembered, and the difference
   between the remembered and actual amounts of free memory is displayed
   in the  Chip  and  Fast  memory graphs.

   Note that Intuition may allocate memory for its IDCMP messages while
   a window is open. Just clicking in a window may result in allocation of
   some memory, as is any other Intuition event. This memory will not be
   freed by Intuition until the window is closed.
```

```
MENU SELECTION
   Project / Flush & Remember

KEYBOARD SELECTION
   Right-Amiga R
```

1.13 Save Settings

```
Save Settings

DESCRIPTION
   The current configuration of GSM is written to its Workbench icon file
   as  Tool Type  values.

   If GSM cannot find its icon file, nothing is saved.

MENU SELECTION
   Project / Save Settings
```

1.14 About GSM

```
About GSM

DESCRIPTION
   Shows a requester with version number and copyright information.

   Unlike the About requesters of virtually all other programs, this is
   a non-modal system requester. Non-modal means, it does not suspend
   the operation of the program.

   If there is already a GSM about requester hanging around on the screen,
   that window will pop up to front and is made active.

MENU SELECTION
   Project / About...
```

1.15 Quit GSM

```
Quit GSM

DESCRIPTION
   Terminates GSM.

   If an  about  requester is still open, that window is
   closed.

MENU SELECTION
   Project / Quit
```

```
KEYBOARD SELECTION
   Right-Amiga Q

SHELL SELECTION
   GSM listens to Control-C signals and the BREAK shell command if started
   from a  shell .
```

1.16 Display free Chip memory

```
Display free Chip memory

DESCRIPTION
   Shows a graph of free chip memory in your system. The amount of free
   chip memory is also displayed as text, as is the difference from a
   previously  remembered  amount.

   Optionally the  fragmentation  rate of chip memory is displayed
   in the same graph using a second color.

   Beneath the graph is a comment line reading:
      CHIP (aaaaaK)  bbbbbK free (+cccccc) Frag: ddd%
   where:
      aaaaa = total amount of chip memory in the system in Kbytes.
      bbbbb = current amount if free chip memory in Kbytes
      cccccc = difference between the current amount of free chip
         memory and the remembered amount in bytes. Positive values mean
         there is more free memory, negative values mean there is less free
         memory.
      ddd = chip memory fragmentation rate.
   This line might appear slightly different depending on available room in
   the window and options selected.

   The  speed  at which the graph proceeds is user controllable,
   as are the  colors  in which it is drawn.

MENU SELECTION
   Display / Chip Memory
   This menu item toggles the chip memory display.

WORKBENCH TOOLTYPE
   Use the CHIP  tooltype  to get the chip memory display.

SHELL ARGUMENT
   Use the CHIP  argument  to get the chip memory display.
```

1.17 Display free Fast memory

```
Display free Fast memory

DESCRIPTION
   Shows a graph of free fast memory in your system. The amount of free
   fast memory is also displayed as text, as is the difference from a
```

```
   previously  remembered  amount.

   Optionally the  fragmentation  rate of fast memory is displayed
   in the same graph using a second color.

   Beneath the graph is a comment line reading:
      FAST (aaaaaK)  bbbbbK free (+cccccc) Frag: ddd%
   where:
      aaaaa = total amount of fast memory in the system in Kbytes.
      bbbbb = current amount if free fast memory in Kbytes
      cccccc = difference between the current amount of free fast
         memory and the remembered amount in bytes. Positive values mean
         there is more free memory, negative values mean there is less free
         memory.
      ddd = fast memory fragmentation rate.
   This line might appear slightly different depending on available room in
   the window and options selected.

   The  speed  at which the graph proceeds is user controllable,
   as are the  colors  in which it is drawn.

MENU SELECTION
   Display / Fast Memory
   This menu item toggles the fast memory display.

WORKBENCH TOOLTYPE
   Use the FAST  tooltype  to get the fast memory display.

SHELL ARGUMENT
   Use the FAST  argument  to get the fast memory display.
```

1.18 Display memory fragmentation

```
Display memory fragmentation

DESCRIPTION
   Shows a graph of chip and fast memory fragmentation rate.
   The graph is displayed in the free  chip  and  fast  memory displays,
   using a second color to make it distinguishable from the free memory
   graph.

   Fragmentation is not displayed if the corresponding memory display is
   not selected.

   Fragmentation is computed as a percentage:
     0% means that all free memory is in one (large) block
   100% means that all free memory is scattered around in many little pieces

MENU SELECTION
   Display / Fragmentation
   This menu item toggles the fragmentation graph in the free memory
   displays.

WORKBENCH TOOLTYPE
   Use the NOFRAG  tooltype  to prevent the fragmentation display.
```

```
   By default the fragmentation rate is displayd.

SHELL ARGUMENT
   Use the NOFRAG  argument  to prevent the fragmentation display, or the
   FRAG  argument  to override a NOFRAG  tooltype .
   By default the fragmentation rate is displayd.

SEE ALSO
    How fragmentation is computed
```

1.19 Display CPU idle rate

```
Display CPU idle rate

DESCRIPTION
   Shows a graph of the average CPU idle rate.

   CPU idle rate is computed as a percentage of the (real) time that the
   CPU is not busy with any task, averaged over the measurement time
   interval.
     0% means the CPU was busy all the time
   100% means the CPU was not busy at all.
   In practice, 100% will never be reached, because there are always
   several background system tasks that consume some CPU time, including
   GSM itself.

   Beneath the graph is a comment line reading:
      CPU Idle aaa%
   where:
      aaa = current CPU idle rate.
   This line might appear slightly different depending on available room in
   the window.

   The  speed  at which the graph proceeds is user controllable,
   as are the  colors  in which it is drawn.

MENU SELECTION
   Display / CPU Idle
   This menu item toggles the CPU idle rate display.

WORKBENCH TOOLTYPE
   Use the CPU  tooltype  to get the CPU idle rate display.

SHELL ARGUMENT
   Use the CPU  argument  to get the CPU idle rate display.

SEE ALSO
    How CPU idle time is measured
```

1.20 Show a grid in the displays

```
Show a grid in the displays

DESCRIPTION
   Shows a grid in the  free chip memory ,  free fast memory
   and  CPU idle rate  displays.

   The grid is displayed in the selected  grid color .
   The grid consists of horizontal lines at 25%, 50% and 75%, and vertical
   lines after every 15 seconds.

   After every minute, the vertical line is drawn as a solid line.

   If the  window height  is too small, the 25% and 75% horizontal
   lines are not drawn.

MENU SELECTION
   Display / Grid
   This menu item toggles the grid in the displays on and off.

WORKBENCH TOOLTYPE
   Use the NOGRID  tooltype  to turn the grid off.
   By default the grid is turned on.

SHELL ARGUMENT
   Use the NOGRID  argument  to turn the grid off, or the GRID  argument
   to override a NOGRID  tooltype .
   By default the grid is turned on.
```

1.21 Control the measurement intervals

```
Control the measurement intervals

DESCRIPTION
   Controls the time to elapse between successive system analyses. This
   effects the speed at which the graphs are drawn.

   The intervals can vary between 250 ms (0.25 seconds) and 5000 ms
   (5 seconds).

MOUSE SELECTION
   Use the slider in the right window border to change the interval
   delay.

WORKBENCH TOOLTYPE
   Use the DELAY=milliseconds  tooltype  to set the initial interval delay.

SHELL ARGUMENT
   Use the DELAY milliseconds  argument  to set the initial interval delay.
```

1.22 Changing the window dimensions

```
Changing the window dimensions

DESCRIPTION
   The GSM window is fully resizeable. If resized, the displays are resized
   too, to reflect the new window size.

MOUSE SELECTION
   Use the standard window drag bar, sizing gadget and zoom gadget to
   move or resize the window.

WORKBENCH TOOLTYPE
   Use the WINDOW=left/top/width/height  tooltype  to set the initial
   window dimensions.

SHELL ARGUMENT
   Use the WINDOW left/top/width/height  argument  to set the initial
   window dimensions.
```

1.23 Public Screen selection

```
Public Screen selection

DESCRIPTION
   Allows the GSM window to open on any public screen.
   If the selected screen cannot be found, the default public screen
   (usually the Workbench) is used.

WORKBENCH TOOLTYPE
   Use the PUBSCREEN=Public Screen Name  tooltype  to select the screen.

SHELL ARGUMENT
   Use the PUBSCREEN Public_Screen_Name  argument  to select the screen.
```

1.24 Font Selection

```
Font Selection

DESCRIPTION
   Select the font to be used for text displays. Both fixed and
   proportional fonts may be used.
   If the font cannot be opened, the system's default font is used.

   I haven't included an ASL font requester in the program. Why not?
   Because the ASL requesters are modal requesters, they stop the program
   if they are opened. And a program like GSM should continue to operate,
   even if requesters are open.

WORKBENCH TOOLTYPE
   Use the FONT=fontname.font and FONTH=font height  tooltypes  to set the
   font to be used. The font name should include the ".font" extension.
   Both a FONT and a FONTH must be present to use the font.
```

```
SHELL ARGUMENT
   Use the FONT=fontname.font and FONTH=font height  arguments  to set the
   font to be used. See the notes in the previous paragraph.
```

1.25 Graph colors

```
Graph colors

DESCRIPTION
   Pick the pen numbers to use when drawing graphs.

   Four colors are recognized:
      BGPEN = background of graph.
      FG1PEN = foreground 1, used for the first function line in a graph.
      FG2PEN = foreground 2, used for the second function line in a graph.
      GRIDPEN = grid color.

   Sharable pens can be used, but they will not be properly obtained by
   GSM.

KEYBOARD SELECTION
   Use function keys F1 to F4 to cycle through the available pens. Combine
   with the SHIFT key to cycle backwards.
      F1 = cycle BGPEN
      F2 = cycle FG1PEN
      F3 = cycle FG2PEN
      F4 = cycle GRIDPEN

WORKBENCH TOOLTYPE
   Use the BGPEN=pen number, FG1PEN=pen number, FG2PEN=pen number and
   GRIDPEN=pen number  tooltypes  to set the colors.

SHELL ARGUMENT
   Use the BGPEN pen_number, FG1PEN pen_number, FG2PEN pen_number and
   GRIDPEN pen_number  arguments  to set the colors.
```

1.26 Window without title bar

```
Window without title bar

DESCRIPTION
   By default, GSM opens a normal window with title bar.
   As an option, the window can be without title bar, and close, zoom and
   depth gadgets.

MENU SELECTION
   Display / Title Bar
   This menu item toggles the title bar.

WORKBENCH TOOLTYPE
   Use the TITLEBAR=yes_or_no  tooltype  to control the title bar.
```

```
   Valid tool type values are:
      NO or 0: open window without title bar
      any other value: open window with title bar.

SHELL ARGUMENT
   Use the TITLEBAR yes_or_no  argument  to control the title bar.
   See the previous paragraph for valid values.
```

1.27 How memory fragmentation is computed

```
How memory fragmentation is computed

What is memory fragmentation?
If free memory is not available as one large chunk, but merely as many
smaller chunks, memory is fragmented.
Memory fragmentation can occur when programs have allocated many separate
pieces of memory, and have not yet returned all these pieces to the
system.
When memory is returned, the Exec will mend adjacent pieces of free memory
together into a larger block, thus decreasing memory fragmentation.

If memory is fragmented, a memory allocation of a large block could fail,
although the total amount of free memory could be sufficient. Allocation
fails because the free memory is subdivided into several parts, each not
sufficiently large to honour the allocation request.
For example: if there are 2 chunks of 512 kB free memory (total 1MB),
and a program requests 513 kB, the allocation will fail.

It is obvious that memory fragmentation is a bad thing.

How is the percentage that GSM shows, computed?
The most important factor is the ratio

    size of largest chunk
   ------------------------                    [1]
    total free memory size

Fragmentation increases if this ratio is smaller. To scale it into [0,1],
the factor

          size of largest chunk
   ( 1 - ------------------------ )             [2]
          total free memory size

is computed. This factor will be zero if all free memory is in one large
chunk, and approaches 1 if free memory is scattered into many small chunks.

The second important factor is the number of free memory chunks. This
is intuitively a measure of fragmentation.
Moreover, if there are more free memory chunks, there is a bigger chance
that any freed memory will mend up with a chunk that is not the largest
chunk, thereby decreasing factor [1].
This leads to a second factor, scaled into [0,1]:

                    1
```

```
   ( 1 - ---------------------- )              [3]
         number of free chunks
```

The fragmentation percentage as displayed by GSM is the product of [2] and [3].

This way of expressing memory fragmentation as a percentage is undoubtedly arbitrary, as is every other way.
If you think you have a better way of computing this percentage, please send me an E-mail.

1.28 How CPU idle time is measured

How CPU idle time is measured

When the CPU is idle, there is currently no task to be executed. So how can you measure this time if nothing is running?

GSM takes advantage of a property of the operating system, namely, that a task with lower priority will never be executed as long as there are tasks with higher priority ready to run.
To measure the CPU idle time, GSM starts a dummy task at the lowest possible priority, -128. This task will get the CPU only if nothing else wants to be run.
Using special Switch and Launch routines, this dummy tasks reads the system clock every time it is launched (execution starts) and switched (execution is suspended).

The total time for which this dummy task has run in a specific interval, is the elapsed time for which no other task was ready to run, i.e. the CPU idle time.

GSM uses E-clock values for maximum accuracy. In fact, the idle time measurement is so accurate you can notice the CPU usage when you move the mouse, for instance.

It is obvious that GSM's strategy doesn't work if there are other tasks in the system running at -128 priority. In particular, if you run GSM more than once at the same time, the CPU idle rate displayed is not accurate. Also, some screen savers (like the standard Workbench screensaver) operate on this priority.

1.29 Known bugs

Known bugs

Currently, there are no known bugs :-)

If you think you found a bug, please let me know.

An actualized list of known bugs in the current version is kept on the GSM Info Page on the World Wide Web.

1.30 Future developments

```
Future developments

Possible enhancements of this program are:
- "Memory map" type display visualizing where the free memory is left.
- Turn GSM into a commodity.

If you feel something else is missing, let  me  know and I might build it
in.

An actualized list of possible future enhancements is kept on the
 GSM Info Page  on the World Wide Web.
```

1.31 Version history

```
Version history

Date       Version Comment

16-11-1995   1.3   Several features added:
                    o Read WB icon file if started from shell
                    o Save Settings in WB icon file
                    o Open on any public screen
                    o Optionally open without title bar
                    o Font and colors can be set
                    o Remember function added
                    o Listens to Ctrl-C break

13-11-1995   1.2   Bug fix: Crashed if no fast memory was present.

24-10-1995   1.1   Bug fix: Due to scaling factors, wrong results were
                   displayed if total memory was > 4 MB. Fixed.

12-10-1995   1.0   Initial release.
```

1.32 The author

```
The author

This program was written by:

   Yvon Rozijn
   Zuideinde 9
   7941 GA Meppel
   The Netherlands

If you have any comments, questions, bug reports, ideas for improvement,
please send me an E-mail. My address is:

   yrozijn@xs4all.nl
```

You can also visit my home page:

   http://www.xs4all.nl/~yrozijn

1.33 GSM Info Page

GSM Info Page

There is a GSM Info Page on the World Wide Web:

   http://www.xs4all.nl/~yrozijn/gsm.html

On this page you will find the latest info on GSM, like:
   o Version number of the latest version
   o Actualized list of known bugs
   o Actualized list of possible future enhancements