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The pace of progress - exact factorials and the past!

Message #1 Posted by [Gene](#) on 29 Apr 2005, 3:48 p.m.

While digging into some of the old TI PPC Notes PDFs I have to figure out why the TI CC40 matrix routines weren't working that I was writing (what? you don't have copies? You should all have copies of the PPC Journal competitor...you just never know when they might be of use! See ** below :-), I came across another TI speed test that caught my eye.

You remember the types of problems people used to do:

* Calculate 1000 digits of PI as fast as you can. * Factor 9999999997 as fast as you can

etc.

This was to calculate EXACT factorials as fast as possible. A program to compute exact factorials in FAST MODE on the TI59 was presented in V8N5P5. Results?

It computed the exact factorial of 610 in 7 hours and 29 minutes.

I pulled out my trusty HP49g+ in exact mode and using << 610 ! >> TEVAL got 9.0956 seconds.

Then I pulled out my Tungsten C (400Mhz X-scale) running Power48, and on the HP49 emulation in exact mode did the same thing.

Time? 2.3901 seconds.

Wow. The HP49g+ is nearly 2962 times faster than the old TI--59 program and my Tungsten C running the HP49 emulator is nearly 11272 times faster.

What a world we live in 22 years later. Gene

** These are available on Viktor Toth's web site and on the HHC2004 conference CD.

Re: The pace of progress - exact factorials and the past!

Message #2 Posted by [J.C. Boco](#) on 29 Apr 2005, 5:43 p.m.,
in response to message #1 by Gene

Yes indeed.

I follow computer chess, and the ride of computer strengths from rank beginner to Grandmaster Strength has been quite a fun journey.

Re: The pace of progress - exact factorials and the past!

Message #3 Posted by . on 29 Apr 2005, 9:44 p.m.,
in response to message #1 by Gene

"I pulled out my trusty HP49g+ in exact mode and using << 610 ! >> TEVAL got 9.0956 seconds."

Thats pretty poor. With the proper sotware (search for FFAC), it takes me about .14 seconds to get the exact result. No, thats not a mistake.

It just goes to show how fast the HP49g+ could be, if it weren't for all the legacy Saturn code.

Re: The pace of progress - challenge #8

Message #4 Posted by [Palmer O. Hanson, Jr.](#) on 29 Apr 2005, 11:06 p.m.,
in response to message #3 by .

Another data point in tha pace of progress: I wrote a 76 step TI-59 program to solve Valentin Albillo's Challenge Number 8 using the flag functions. The run time to find 81619 squared = 6661661161 was a little over 33 hours.

challenge #8 on TI-59

Message #5 Posted by [Marcus von Cube](#) on 30 Apr 2005, 3:42 a.m.,
in response to message #4 by Palmer O. Hanson, Jr.

Quote:

I wrote a 76 step TI-59 program to solve Valentin Albillo's Challenge Number 8 using the flag functions.

Can you post the listing? I'd like to see it run on an emulator...

Re: challenge #8 on TI-59

Message #6 Posted by [doug](#) on 30 Apr 2005, 3:48 a.m.,
in response to message #5 by Marcus von Cube

Quote:

Can you post the listing? I'd like to see it run on an emulator...

Emulator? I didn't knew that an TI-59 emulator exists. Where can I find one?

Re: challenge #8 on TI-59 - Emulators

Message #7 Posted by [Marcus von Cube](#) on 30 Apr 2005, 4:06 a.m.,
in response to message #6 by doug

There is even an online version running as a Java applet:

<http://www.n3times.com/vertigo/>

More can be found on <http://www.ti59.com>

Re: challenge #8 on TI-59 - Emulators

Message #8 Posted by [doug](#) on 1 May 2005, 5:10 a.m.,
in response to message #7 by Marcus von Cube

This is simulator. I doubt it will show the same results as the real TI-59.

Re: challenge #8 on TI-59 - Emulators

Message #9 Posted by [Marcus von Cube](#) on 1 May 2005, 12:44 p.m.,
in response to message #8 by doug

Quote:

This is simulator. I doubt it will show the same results as the real TI-59.

Agreed! I doubt anyone has ever created a circuit or CPU level emulation of the real TI-59.

Re: challenge #8 on TI-59 - Emulators

Message #10 Posted by [doug](#) on 2 May 2005, 1:38 a.m.,
in response to message #9 by Marcus von Cube

Quote:

Agreed! I doubt anyone has ever created a circuit or CPU level emulation of the real TI-59.

AFAIK, no. See the thread <http://www.hpmuseum.org/cgi-sys/cgiwrap/hpmuseum/archv013.cgi?read=47346>

Re: challenge #8 on TI-59

Message #11 Posted by [Palmer O. Hanson, Jr.](#) on 1 May 2005, 11:03 p.m.,
in response to message #5 by Marcus von Cube

The TI-59 solution relies on the flag feature in which the only the ones digit of the value accessed by a St Flg Ind command is used to determine which flag to set. The program won't run well with the printer attached because each time Flag 9 is set the printer goes into TRACE mode.

```
000 61 GTO
001 60 DEG
002 76 LBL
003 11 A
004 02 2
005 32 X<>T
006 09 9
007 09 9
008 09 9
009 09 9
010 09 9
011 42 STO
012 01 01
013 76 LBL
```

014	60	DEG
015	69	OP
016	31	31
017	43	RCL
018	01	01
019	33	X-squared
020	42	STO
021	09	09
022	01	1
023	00	0
024	42	STO
025	00	00
026	76	LBL
027	70	RAD
028	86	STF
029	40	IND
030	09	09
031	01	1
032	00	0
033	22	INV
034	49	PRD
035	09	09
036	97	DSZ
037	00	00
038	70	RAD
039	87	IFF
040	00	00
041	35	1/X
042	09	9
043	42	STO
044	00	00
045	25	CLR
046	76	LBL
047	39	COS
048	22	INV
049	87	IFF
050	40	IND
051	00	00
052	38	SIN
053	01	1
054	85	+
055	76	LBL
056	38	SIN
057	97	DSZ
058	00	00
059	39	COS
060	00	0
061	95	=
062	67	EQ
063	30	TAN
064	76	LBL
065	35	1/X
066	81	RST
067	76	LBL
068	30	TAN
069	43	RCL
070	01	01
071	33	X-squared
072	42	STO

073	11	11
074	91	R/S
075	81	RST

Re: challenge #8 on TI-59

Message #12 Posted by **Marcus von Cube** on 2 May 2005, 9:21 a.m.,
in response to message #11 by Palmer O. Hanson, Jr.

Quote:

The TI-59 solution relies on the flag feature in which only the ones digit of the value accessed by a St Flg Ind command is used to determine which flag to set.

I tried the same on my TI-66 (which was kind of successor to the TI-59 with the same instruction set but without modules). The above mentioned trick does not work on this machine. It looks like I need to separate the last digit on order to make St Flg Ind to work.

Re: challenge #8 on TI-59

Message #13 Posted by **Palmer O. Hanson, Jr.** on 2 May 2005, 9:16 p.m.,
in response to message #12 by Marcus von Cube

I don't remember noting the difference in flag implementation. My TI-66 and manual aren't immediately available. I may be able to get to them next month.

Re: challenge #8 on TI-59

Message #14 Posted by **Palmer O. Hanson, Jr.** on 2 May 2005, 10:12 p.m.,
in response to message #13 by Palmer O. Hanson, Jr.

While I do not have my TI-66 or the TI-66 manual available at this time I do have the issues of TI PPC Notes from the period when the TI-66 came on the market. Page 6 of the Volume 9 Number 9 issue released in early 1984 states:

"... There is no indirect StFlg/IfFlg capability to operate on the least significant digit of a value in the indirect register ..."

While looking for that I found the following limitation on the TI-59 flag capability on page 17 of the Volume 8 Number 2 issue:

"... the StFlg Ind XX sequence sets a flag according to the ones digit if the value in register XX is an integer of twelve digits or less. If the value in register XX is an integer of thirteen digits then the StFlg Ind XX function sets a flag on the basis of the tens digit. ..."

Now you know more about all of this that you probably ever wanted to know. One of my friends used to say that Palmer is the kind of person who, if you ask him for the time of day, tells you how to build a clock.

Re: The pace of progress - exact factorials - 610!

Message #15 Posted by **Marcus von Cube** on 30 Apr 2005, 4:00 a.m.,
in response to message #1 by Gene

I always thought that the TI-92 (and its siblings) ran derive as their CAS but that's not entirely true:

Derive 6 on a PC can compute the factorial of 610 in exact mode within a fraction of a second. It displays all 3307 (?) digits. (Enter 610! and then press the [=] icon.)

The same on my TI-92+:

In exact mode 610! results in 610! (Too big to be evaluated)

In approximate mode: oo (with a warning about overflow.)

Re: The pace of progress - exact factorials - 610!

*Message #16 Posted by . on 30 Apr 2005, 4:05 a.m.,
in response to message #15 by Marcus von Cube*

Your PC has a hundred times the CPU speed and memory of the TI-92.

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