ELE101
Precept 9

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April 22-23, 2004

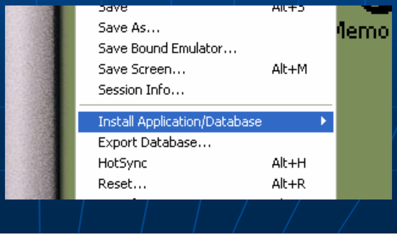
Palm Databases
&
Debugging Strategies

Review & outline

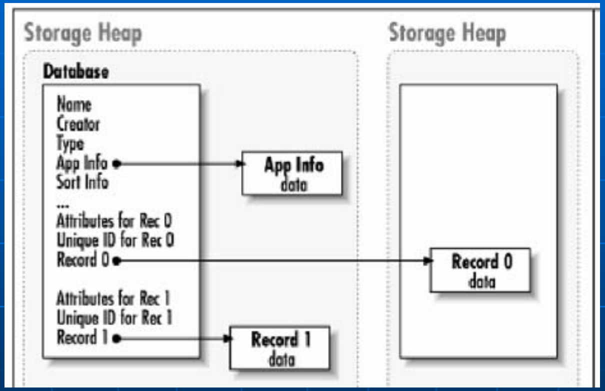
- Last time:
  - Palm **.rcp** resource scripts
- Today:
  - Palm **.pdb** databases
  - Debugging strategies

Setup instructions

- Nothing out of the ordinary.
- Download the precept 9 files, unzip **precept9.zip**, open up **ele101login.bat**, run the emulator (using **emulator &**) and install **record.prc**.



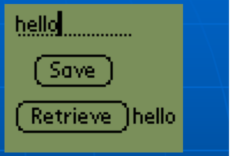
Palm databases review

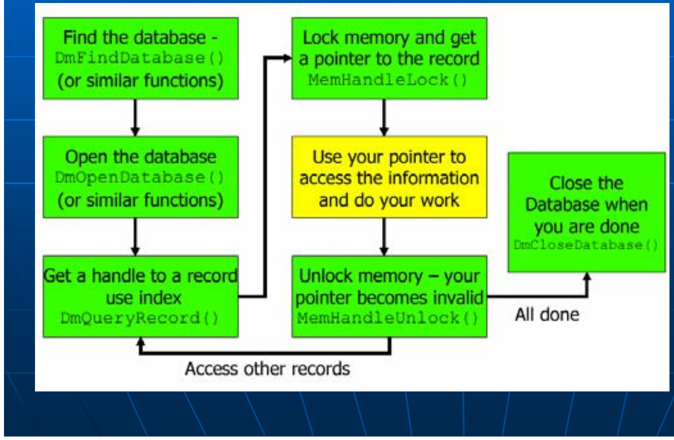


- Records are held in FLASH memory and are directly accessible through memory operations.

Palm database example

- Our test program: **record**




Find the database - DmFindDatabase() (or similar functions)

Open the database DmOpenDatabase() (or similar functions)

Get a handle to a record use index DmQueryRecord()

Lock memory and get a pointer to the record MemHandleLock()

Use your pointer to access the information and do your work

Unlock memory – your pointer becomes invalid MemHandleUnlock()

Close the Database when you are done DmCloseDatabase()

All done

Access other records

What's new in this program?

Persistent storage

Administrivia

- Think about and read up on your final project.
- Office hours after precept today.

- Mobile computing in the news:

Intel XScale Chips Grow Up

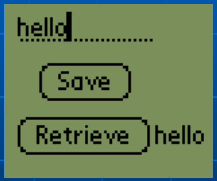
April 12th, 2004

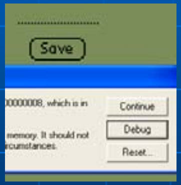
"The company announced a new family of processors in the XScale line, saying the devices can handle various forms of wireless broadband with enough muscle for applications such as *DVD quality full-motion video conferencing*"

"[The Intel PXA27x XScale family] includes *Wireless MMX* technology, which aims to increase 3D game performance while conserving power."

Debugging

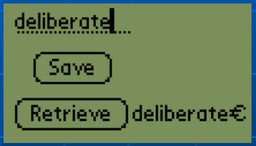
- What were some of the problems with our **record** program?





)000008, which is in

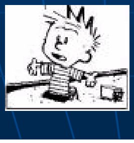
memory. It should not
ircumstances.



- When thinking up good test cases, consider that the extreme cases (a.k.a. corner cases) are the most likely to go wrong.

Debugging – passive methods

- Sitting and staring at the code.
- Rearranging your program aimlessly until the bug disappears.
- Installing your program on the bug-tolerant Palm instead of the emulator.
- Emailing your source code to the TA.



Debugging with a debugger

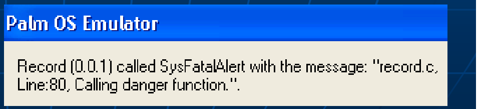
- Click the home icon button in the emulator to return to the applications list.
- In the ele101login prompt, type:
  ```
  m68k-palmos-gdb record
  ```
- Then in the debugger, put:
  ```
  target pilot localhost:2000
  ```
- Click the **record** icon to enter our program.
- Back in the ele101login window, type:
  ```
  continue
  ```
- Now let's make our program crash and this time the 'Debug' button will actually do something.
- One example of a useful debugger command:
  ```
  bt
  ```

Debugging with assertions

- *Assertions* are covered in Chapter 24, page 539. Assertions “allow a program to monitor its own behavior and detect possible problems at an early stage.”
  ```
  dayofmonth = GetBirthdateDay();
  assert(dayofmonth >= 1 &&
         dayofmonth <= 31);
  /* Then go on to safely use the
     dayofmonth variable in our program. */
  ```
- The equivalent of **assert()** for Palm OS programming is **ErrFatalDisplayIf()**:
  ```
  ErrFatalDisplayIf(dayofmonth < 1 ||
    dayofmonth > 31, “Invalid day”);
  ```

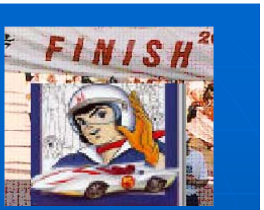
Directly outputting debug information

- Usage of extra **printf()** statements was helpful for examining your program's execution in assignments 1-4.
- In assignments 5 and 6, the same goes except we had to use **StrPrintF()** + **WinDrawChars()**.
- **ErrDisplay()** may be just as handy in your upcoming project. Example:
  ```
  ErrDisplay(“Calling danger function.”);
  danger_function();
  ```



Record (0.0.1) called SysFatalAlert with the message: "record.c, Line:80, Calling danger function.".

In Conclusion



- Palm databases
  - An interface geared towards mobile applications: uses memory handles instead of file streams.
  - Remember to lock/unlock the memory chunks!
- Debugging
  - You can use a debugger.
  - Can use assertions.
  - Can even use plain display messages.
  - But whatever you do, do something!
- Good luck on the final project!