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Английский язык

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по научно-техническому переводу
и реферированию

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МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РФ

ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ПРОФЕССИОНАЛЬНОГО ОБРАЗОВАНИЯ «НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНОЛОГИЧЕСКИЙ УНИВЕРСИТЕТ «МИСиС»

Кафедра русского и иностранного языков и литературы

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Целью учебно-методического пособия является формирование навыков перевода научно-технических текстов, а также говорения на заданную тему. Представлены материалы, направленные на формирование лингвистической и дискурсивной компетенций. Содержатся упражнения на овладение лексическим материалом по теме, стилистическими особенностями научной речи; задания на описание таблиц, графиков, рисунков и прочих типов графической информации; на обучение письменному научно-техническому переводу, аннотированию и реферированию научных статей, их обсуждению.

Предназначено для студентов, обучающихся по направлению «Прикладная математика и информатика».

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Unit 1. Mobile Supercomputers

Warm-Up

Before you read the text, discuss in pairs:

Which generation of computers has already been released? Which one do we use?

Will cell phones replace personal computers?

I. Reading

Mobile Supercomputers

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Moore's law has held away over the past several decades, with the number of transistors per chip doubling every 18 months. As a result, a fairly inexpensive CPU can perform hundreds of millions of operations per second – performance that would have cost millions of dollars two decades ago. We should be proud of our achievements and rest on our laurels, right? Unfortunately, no. The human appetite for computation has grown even faster than the processing power that Moore's law predicted. We need even more powerful processors just to keep up with modem applications like interactive multimedia communications. To make matters more difficult, we need these powerful processors to use much less electrical energy than we have been accustomed to.

In other words, we need mobile supercomputers that provide massive computational performance from the power in a battery. These supercomputers will make our personal devices much easier to use. They will perform real-time speech recognition, video transmission and analysis, and high-bandwidth communication. And they will do so without us having to worry about where the next electrical outlet will be. But to achieve this functionality, we must rethink the way we design computers. Rather than worrying solely about performance, with the occasional nod to power consumption and cost, we need to judge computers by their performance-power-cost product. This new way of looking at processors will lead us to new computer architectures and new ways of thinking about computer system design.

A mobile computing world

Untethered[1] digital devices are already ubiquitous. The world has more than 1 billion active cell phones, each a sophisticated multiprocessor. With sales totaling about $400 million every year, the cell phone has arguably become the dominant computing platform, a candidate for replacing the personal computer.

We expect to see both the types and numbers of mobile digital devices increase in the near future. New devices will improve on the mobile phone by incorporating advanced functionality, such as always-on Internet access and human-centric interfaces that integrate voice recognition and videoconferencing. We also anticipate the emergence of relatively simple, disposable devices that support the pervasive computing infrastructure – for example, sensor network nodes. The requirements of low-end devices are increasing exponentially, and computer architectures must adapt to keep up.

Some elements of high-end devices are already present in 3G cell phones from the major manufacturers. High-end PDAs also include an amazing range of features, such as networking and cameras.

Supercomputer requirements

A mobile supercomputer will employ natural I/O interfaces to the mobile user. For example, input could come through a continuous real-time speech-processing component. Device output will include high-bandwidth graphics display, either as a semitransparent heads-up display or an ocular interface such as a retinal projector. An audio channel will support output for audio reception and sound cues. Finally, the device will include a high-bandwidth wireless interface for network and telecommunication access.

This platform will have to execute many computationally intensive applications: soft radio, cryptography, augmented reality, speech recognition, and mobile applications such as e-mail and word processing. We expect this platform to require about 16 times as much computing horsepower as a 2-GHz Intel Pentium 4 processor, for a total performance payload of 10,000 SPECInt benchmark units (www.specbench.org).

To remain mobile, the device must achieve this extremely high performance using only a small battery for power. Given the slow growth trend for batteries – 5 percent capacity increase per year – we estimate that a mobile supercomputer (circa 2006) will require a 1,475 mA-hr battery weighing 4 oz. With a five-day battery lifetime under a 20 percent

[1] *Unlinked, non-stationary.*

duty cycle (peak load versus standby), we estimate that the system's peak power requirement must not exceed 75 mW.

Performance and power trends

Unfortunately, mobile supercomputing's requirements are in contrast to the trends we see in both computer architecture and power for future devices.

Figure 1.1 shows the trends in performance, measured in SPECInt, for a family of Intel x86 processors. Figure 1.2 shows the power consumption trends in the same processors. The graphs represent the published data for processors ranging from the 386 (in 1990) to the Pentium 4 (in 2002) in roughly two-year steps. The predicted trends through 2008 are derived from the 2003 edition of the *International Technology Roadmap for Semiconductors* (http://public.itrs.net/).

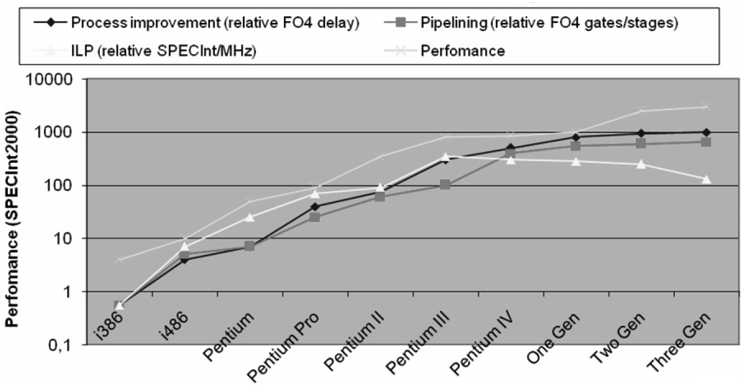

Figure 1.1. Performance trends for desktop processors

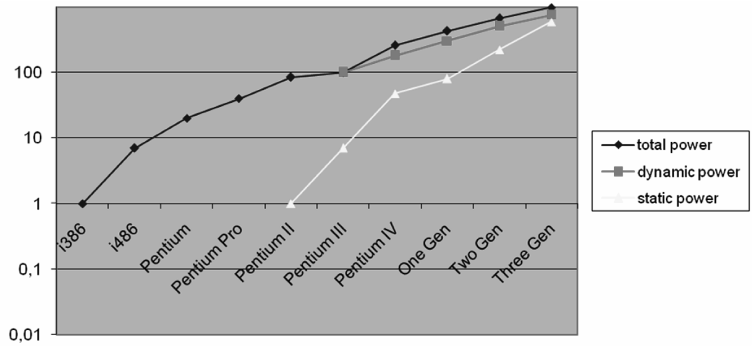

Figure 1.2. Power trends for desktop processors