

2011年 中国**嵌入式**暨物联网教育发展高峰论坛

《智能终端与物联网应用》

课程建设与实践

邝坚

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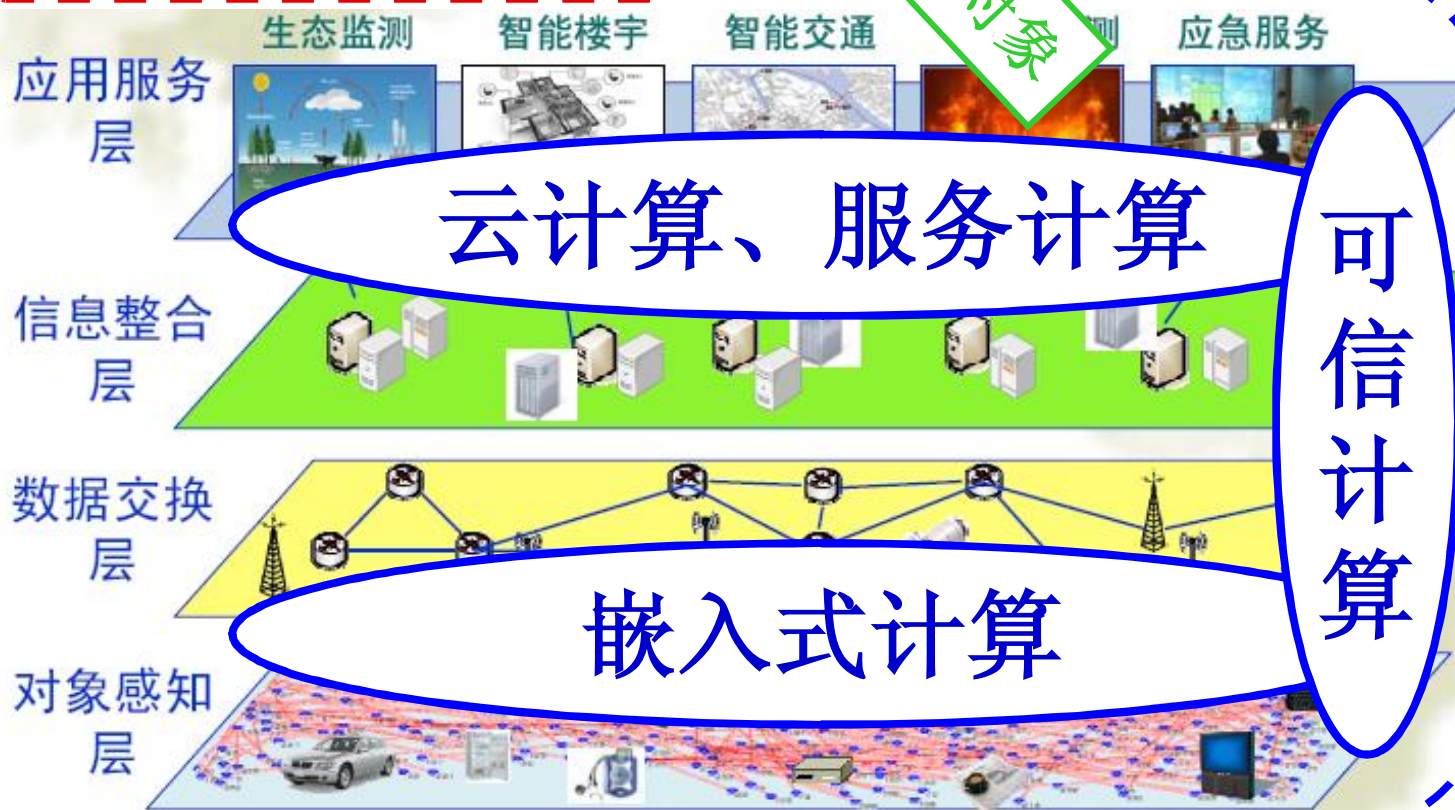


移动互联网



服务对象

- 服务
 - 理解
 - 交换
 - 感知
- 安全



p 移动互联网发展迅猛

- ü 第27次中国互联网络发展状况统计报告（CNNIC）指出截至2010年12月，中国互联网用户数已达到**4.57亿**，其中移动互联网网民数已达**3.03亿**，占总体互联网用户的**66.2%**
- ü 移动应用的多样性持续激发用户需求、智能终端奠定了用户高速增长的基础



p 中国移动终端用户发展快速

- ü 2011年上半年中国移动终端用户数突破9亿，其中3G用户突破7000万

p 智能终端（手机）应用开发人才需求猛增

- ü 200% -300%的同比增长需求
- ü 北京、长三角、珠三角等地人才缺口大

构建三维立体智能终端应用开发 技术推广模式



北邮计算机学院目前共开设了7门涉及智能终端技术的研究生及本科生课程，其中《智能终端与物联网应用》于2010年开设。

	讲授内容	学时	专业	学生层次
1	《协议工程与通信软件》	36学时	全校各专业	研究生
2	《计算机通信新技术》	36学时	全校各专业	研究生
3	《嵌入式系统综合设计与实验》	32学时	计算机专业 网络工程专业	本科生
4	《嵌入式操作系统与通信软件》	32学时	计算机专业 网络工程专业	本科生
5	《手机操作系统及其应用》	32学时	全校各专业	本科生
6	《嵌入式系统》	36学时	全校各专业	研究生
7	《智能终端与物联网应用》	32学时	全校各专业	本科生

教学目的:

- ü 了解移动智能终端的技术发展、应用现状和开发特点;
- ü 了解移动智能终端的体系结构、硬件系统和主流操作系统;
- ü 了解物联网的基础设施、体系结构及其核心技术;
- ü 了解物联网业务应用特点;
- ü 掌握Android和OMS应用开发技术。

课程基本内容及学时分配:

1、概述（2学时）

1) 智能终端的发展及应用

- ü 什么是智能终端
- ü 智能终端的发展及其应用
- ü 智能终端技术特点

2) 物联网的发展与应用

- ü 什么是物联网
- ü 物联网的发展及其应用
- ü 物联网应用特点

2、智能终端技术（6学时）

1) 智能终端体系结构

2) 智能终端硬件系统

- ü 智能终端硬件系统组成
- ü 智能终端处理器及其技术特点
- ü 智能终端通信接口技术

3) 智能终端软件系统

- ü 智能终端软件系统构成
- ü 智能终端操作系统平台及其特点

3、物联网及其应用（8学时）

1) 物联网体系结构

- ü 物联网基础架构

- ü 物联网分层的体系结构

- ü 物联网关键技术

2) 物联网感知技术

- ü RFID技术

- ü 传感器技术

3) 物联网网络技术

- ü Ad Hoc与无线传感器网络技术

- ü 3G网络技术

- ü IPv6网络技术

- ü NGN技术

- ü 无线局域网技术

4) 物联网应用

- ü 物联网业务应用模式

- ü 物联网应用涉及的技术（云计算、虚拟化等）

- ü 典型应用举例

4、智能终端开发技术（16学时）

1) 面向物联网应用的智能终端开发模式

2) 智能终端应用开发技术

（Android、OMS）

- ü 平台架构

- ü 应用开发环境

- ü 应用程序模型

- ü 图形用户界面设计

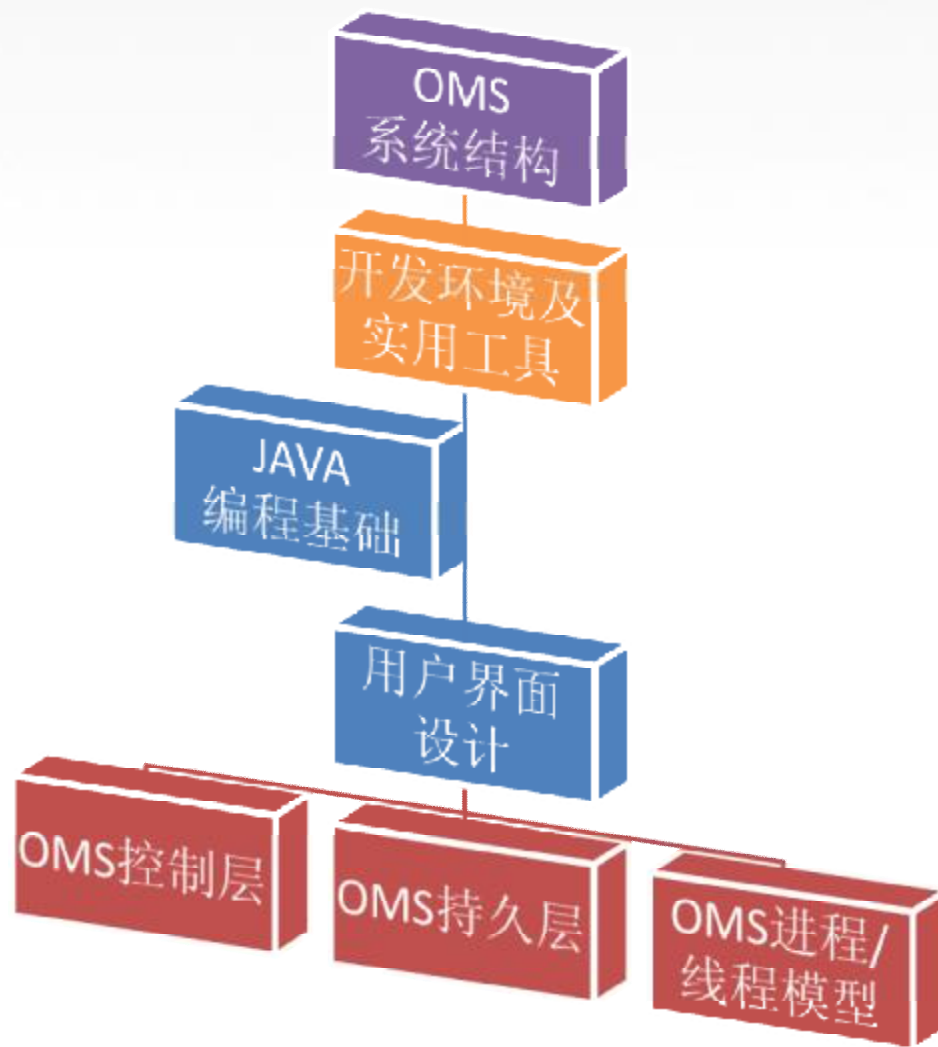
- ü 移动数据存储

- ü 移动多媒体应用

- ü 网络通信实现

- ü 典型传感器控制应用等

3) 业务设计开发实践



建立了多层次、系列化的实验教学体系，开发出16个不同层次的实验。

ü多层次：就是根据对学生掌握智能终端应用开发技术能力的要求不同而设计不同水平的实验内容，分为多个层次；

ü系列化：就是每个层次由一组实验构成，不同层次的实验形成系列，相辅相成，循序渐进。



在第10届IEEE嵌入式软件和系统国际会议上，发表了2篇涉及智能终端应用开发技术教学的论文。

Exploration on Cultivating OPhone Technology Talents in Universities

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Abstract

With the development of terminal technology, OPhone platform is playing more and more influential role in people's daily life. Taking chance of the prosperity of OPhone technology, this paper aims at bringing forth some explorations on cultivating OPhone technology talents in universities. Firstly, some inductions are given to illustrate the developing situation of OPhone technology, after which comes some technological backgrounds. Then, we make a further analysis dealing with the necessities, the advantages and the disadvantages of cultivating OPhone technology talents in universities. Finally, resorting on our teaching experiences of many years in BUPT, we put up with some effective strategies of popularizing OPhone technology in universities.

1. Introduction

As the rise of high technologies around the world, the way of accessing to information is subtly changed. Mobile Internet and Internet of things give people more opportunities to perceive the required or the potential information they are interested in, anywhere and anytime. A series of intelligent terminal, which is acting as the information collector, processor, transmitter and the most direct interface provider, is playing more and more important role in the daily life. Meantime, the extensive usage of Terminal Technology also put forward higher requirements for the related professionals and developers. How to bring up high-quality professionals in the area of Terminal Technology becomes a hot topic dealing with college education.

Taking OPhone, which is an outstanding terminal platform, as the main technological framework, this thesis is tending to make some cutting-edge discussion about how to create an OPhone-tech education model in the institution of higher education.

2. Characters and prospects of OPhone technology

2.1 Characters of OPhone technology

Advanced Technology—OPhone platform learns lots of excellent characters from other mature mobile platform, coming into birth with many instinctive advantages inherited from famous Google Android platform, including underlying open-source Linux OS core, flexible Java application framework and so on. It gives more friendly experiences to final users, and also provides a suit of mobile telephone solution and kinds of data service solution [1].

Monolithic Design—OPhone provides a monolithic mobile Internet solution from hardware reference design and upper layer services to terminal application software. Terminal emulator and custom-built IDE make it more convenient and time-saving to develop OPhone applications.

Enhanced Security—Extensive mobile applications will be chained up without secure, reliable development environment. To meet various complicated requirements for the mobile communication services, OPhone platform provides an improved mechanism, in which security policies are attached into multiple layers, hopefully making mobile terminal and user data more security. Otherwise, another backup and recovery mechanism is introduced, allowing backup and recovering of various user data and system data according to user's need, in case the sensitive data get lost without any awareness.

Persistent Extensibility—OPhone is instinctively an open and shareable platform with flexible architecture and extendable application interface.

Research and Practice of Experimental Teaching System for OPhone Technology Courses

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Abstract

OPhone is an open source platform in intelligent terminal released by China Mobile. With the increase of various applications based on the platform, OPhone education is becoming more and more important in colleges and universities. This paper introduces OPhone platform and OPhone education in the beginning. Then the necessity of setting up an experimental teaching system for OPhone technology courses is expatiated on. After that, we put up with an experimental teaching system with four layers: preliminary experiments, basic experiments, advanced experiments and innovative experiments, according to requirements of training students in different levels. Finally, we give some opinions on how to practice the experimental teaching system in BUPT.

1. Introduction

OPhone is an intelligent terminal platform based on Linux operating system and Android released by China Mobile. It is developed by China Mobile with novel user interface, powerful browser and more compatible WAP. In addition, many famous engines in field of multimedia and browser are optimized, and some advanced middleware such as game, Widget and Java ME are included. OPhone is oriented to mobile Internet applications, which is friendly and easy to use [1].

OPhone is an open source platform, which relates content providers, developers and consumers closely in together. In order to provide convenience of publishing innovative applications for developers, China Mobile open an on-line shop named Mobile Market (www.mmarket.com) while releasing OPhone platform. At present, the number of China Mobile users has reached 700 million which will continually increase with the popularity of 3G network. Meanwhile, there will be various applications based on

OPhone platform emerging endlessly. With the demand for OPhone developers greatly increasing, the OPhone talent training has become a burning issue.

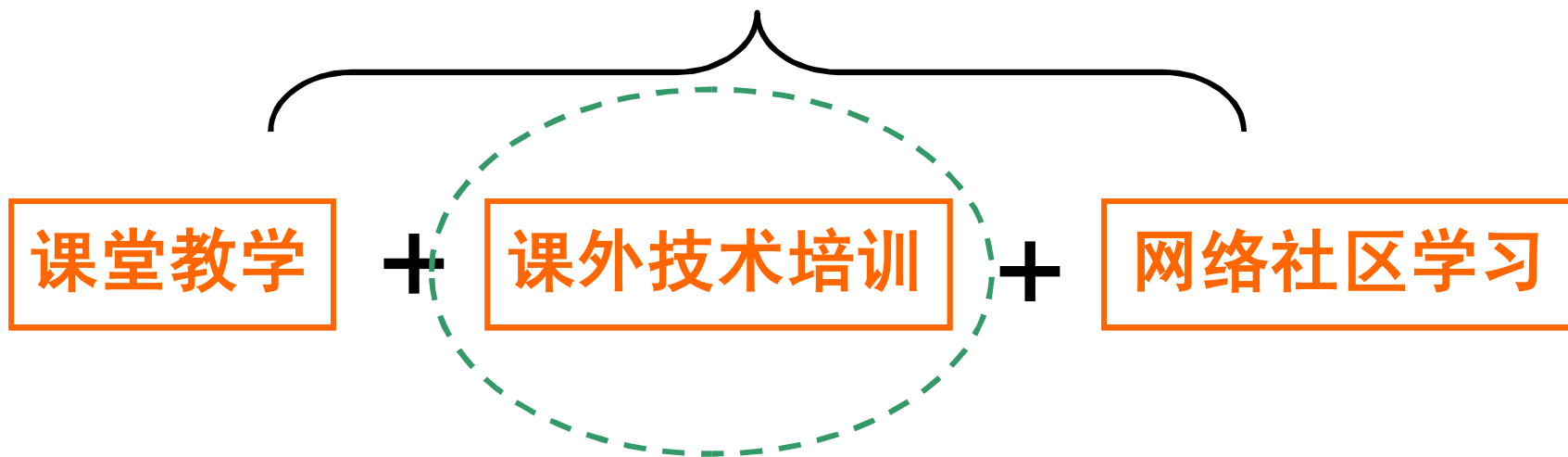
Now the development of mobile application based on OPhone platform is still in its infancy, and the education of OPhone technology in colleges and universities just starts. Therefore, people care about that how to develop OPhone technology education, how to set up the courses and how to plan the teaching content. In particular, for that only through practice can student master OPhone technology better, experiment teaching of OPhone becomes essential. Thus, the way to set up a scientific experiment teaching system and offer rational experiment content is worth further research.

2. The necessity of building multi-layer and serial experiment teaching system for OPhone

In order to meet the need of training OPhone talent, OPhone courses have been or are about to be set in many colleges and universities. The best feature of OPhone courses is applicability. So practice is very important during OPhone course teaching. Students will obtain and understand the knowledge learned in OPhone course better only if they have developed applications on OPhone platform. What's more, the practice can also improve their capability of development.

The core of OPhone courses is introducing development technologies based on OPhone, including the following aspects: system architecture, developing environment, application model, graphical user

构建三维立体智能终端应用开发 技术推广模式



2010年3月5日北邮Ophone俱乐部成立，目前人数达到600多人，成为北邮规模最大、人数最多的技术类学生社团之一。



北邮-Google Android实验室
(2010)

依托相关技术俱乐部，2010-2011年完成了8期智能终端应用开发技术培训。

第一期：普及型，2010年3月，共20学时，150人左右。

第二期：开发型，2010年7月，40人参加（限定名额）。

第三期：MM（Mobile Market）创业技术培训班，2010年9月在校本部举行，有300多人参加。

第四期：MM（Mobile Market），2010年10月宏福校区举行，有200多人参加。

第五期：开发型，2010年10月，有40人参加（限定名额）。

第六期：普及型，2010年11月在宏福校区举行，有300多人参加。

第七期：普及型，2010年11月在校本部举行，有170多人参加。

第八期：开发型，2011年1月，30多人参加（面向毕业设计学生）。



- p 编写了1本理论与实践一体化的智能终端应用开发技术（Android、OMS）培训教材（试用）
- p 建设了智能终端应用开发技术（Android、OMS）测试题库（400多题）

构建三维立体智能终端应用开发 技术推广模式

课堂教学

+

课外技术培训

+

网络社区学习

2010年3月，智能终端开发技术版面入驻“北邮人”论坛学术科技讨论区。

北邮人论坛 >> 学术科技 >> 智能终端开发技术 >> 阅读文章

服务器时间: 2010-05-10 14:53

发表话题 快速回复

文章主题: 模拟器1.5 : Avd 创建, adb 命令攻略

WJvj

发信人: WJvj (ZYBD), 信区: MobileTerminalAT
标题: 模拟器1.5 : Avd 创建, adb 命令攻略
发信站: 北邮人论坛 (Thu Mar 25 21:18:16 2010), 站内

模拟器1.5 : Avd 创建, adb 命令攻略

google 上面下载Android的SDK 或者Ophonesdn 下载Ophonesdk, 解压出来然后在SDK的根目录下有一个tools 文件夹, 双击emulator.exe, 直接启动模拟器。

模拟器1.5

1. 模拟器外观的定制:
480x320, landscape: emulator -skin HVGA-L
320x480, portrait: emulator -skin HVGA-P (default)
320x240, landscape: emulator -skin QVGA-L
240x320, portrait: emulator -skin QVGA-P

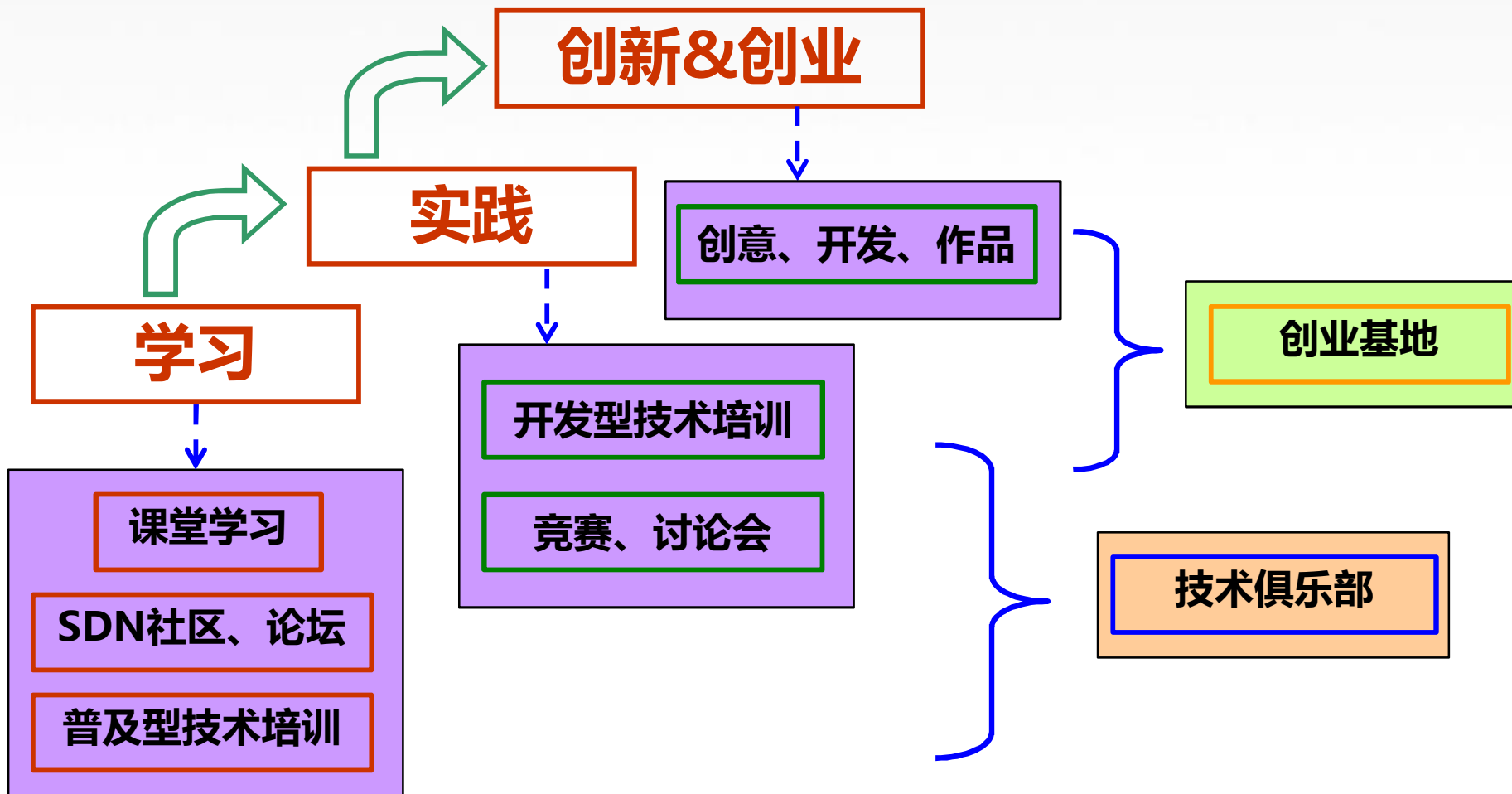
2. 为模拟器加上SD 卡:
emulator -sdcard D:\sdcard.ing
下面我们来说说如何创建"sdcard.ing"文件:
"tools"目录下还有另外一个很好用的工具"mkcard.exe", 一看名字就知道——make sdcard. 对, 就用它来创建一个"SD 卡".
命令为:
mkcard 512M D:\sdcard.ing
OK, 这样一个容量为512M 的SD 卡就创建完毕了.
使用SDCard:
创建: mkcard <S12M>
(bytes (default), K, M)
连接到模拟器: emulator -sdcard <目录/sdcard.ing>
传文件到SDCard: adb push <目录/myaudio.mp3>

3. 模拟器的通信GPhone 的模拟器有个特有的号码: 15555218135, 这个就类似我们实体手机的SIM 卡号码啦. 拨号, 三步:

等级	用户
文章	29
积分	31
星座	白羊座

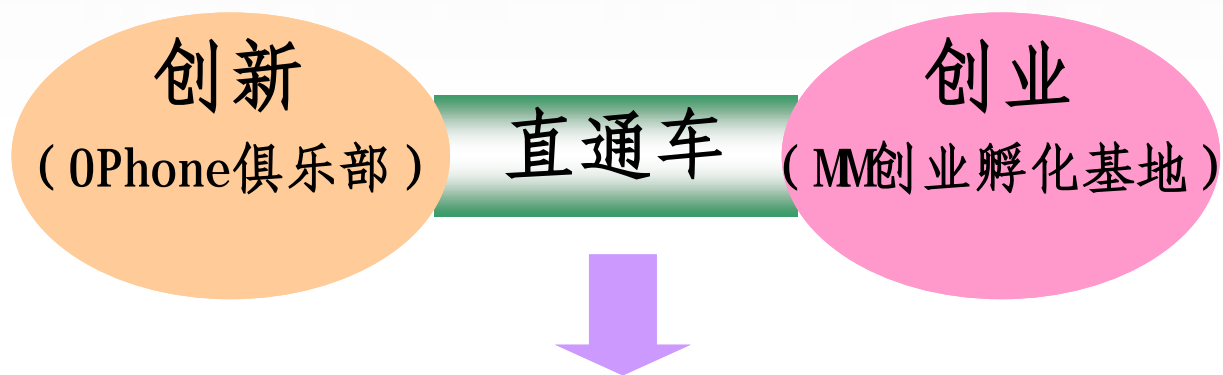
2010年5月，北邮OPhone SDN网站启动仪式在北京邮电大学成功举办。





2010年10月，北邮与中国移动成立了“北邮-中国移动MM (Mobile Market) 创业孵化基地”。





智能终端开发环境（开发平台、实验室）

打造产品（工作室、团队）

p 智能终端开发平台

通过开发平台建设，支持智能手机客户端(含IMS客户端)应用开发的联调、测试等。

p 智能终端应用开发实验室

智能手机（30部）

智能终端硬件开发板（10套）



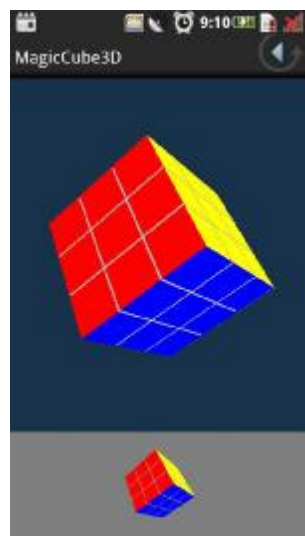
- p 成立了“零点移动应用创新工作室”
- p 组建多个开发团队（其中一个团队是开放式的，面向北京各高校，优势互补）
- p 以“产品+精品”为目标（理念）开始研



零点涵义：意味着新的一天的开始，孕育着新的希望，也定会有新的收获。

截止到目前，“MM创业孵化基地”
已开发出**70个**智能手机应用软件产
品，并提交到移动商城（其中单个作
品周下载量最高达**600次**）

- u 获得20个软件著作权
- u 申请了8项技术发明专利



在“全国首届MM（Mobile Market）百万青年创业计划”大赛中，北邮有11件作品入围终审，在与众多移动互联网知名公司和工作室的专业团队激烈角逐中，北邮2件作品获得大赛银奖。



在该活动北京地区评选的“十大创业明星”中，北邮2名学生获得此称号（第1名、第2名）；“十大优秀创业人才”奖获得者中，北邮7名学生获得该奖。北邮获奖数量及质量在北京参赛高校中名列第一。

- 移动互联网智能终端应用中间件开发（“新一代宽带无线移动通信网”国家科技重大专项，2011ZX03002-003-01）
- MM移动应用软件开发（北京移动）
- 智能终端应用安全中间件及其物联网应用研究（北京市教委）
- 智能手机嵌入式软件平台研发及产业化（核高基，2009ZX01039-002）

END Thanks