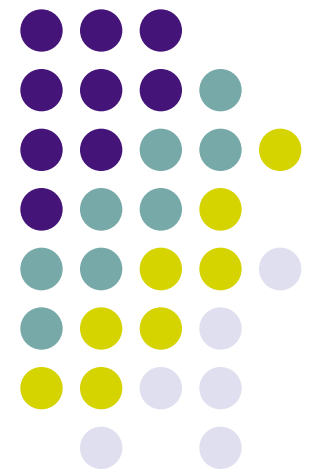


# Study and Development of Simulation Teaching Platform for Deaf/Hard of Hearing Students

Dengfeng Yao  
Beijing Union University

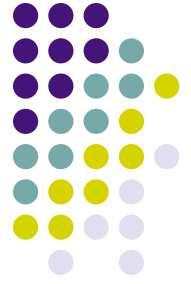




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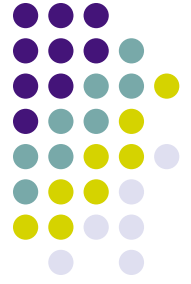
Beijing Union University, Dengfeng Yao

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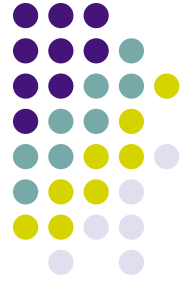


# About us

- Dengfeng Yao
- a hard-of-hearing teacher at the Special Education College of Beijing Union University, mainly studying accessibility information technology and artificial intelligence. I graduated from Computer Science at the Hubei Institute for Nationalities, getting a B.A. degree in 2002. In 2006 I received the master degree of Software Engineering of Peking University.



- Han Yumin
- a senior engineer at the Special Education College of Beijing Union University, mainly studying simulation technology
- graduated from Computer Science at the Beihang Univ, getting a B.A. degree.

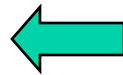


- Jiang Xuefeng
- an engineer at the Special Education College of Beijing Union University, mainly studying network technology
- graduated from Computer Science at the Peking University, getting a M.A. degree.



# Outline

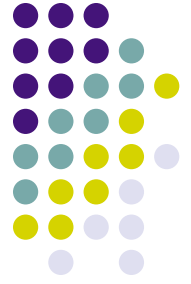
- Our goal
- why
- What
- How
- Benefits
- Problems
- Summary
- Thanks





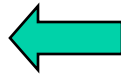
# Our goal

- To use the hearing-impaired students' characteristics to develop the computer language teaching .
- To get over barriers caused by the defects in hearing
- To teach knowledge in the most effective way



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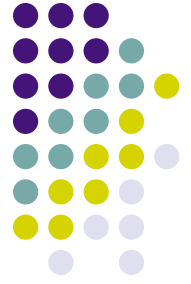
# Why to introduce simulation technology?

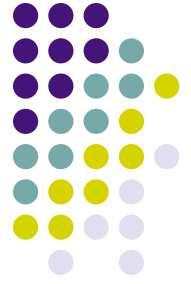


- 听障大学生知识基础差、且参差不齐。 Deaf/Hard of Hearing Students were poorly prepared , and the levels of the students will not even in China.
- 常规的教学方式不能适应对听障学生的教学要求 The conventional teaching methods can not meet the needs of hearing-impaired students' teaching requirements.
- 它优良的计算机界面图象仿真功能，适用于听障学生。 It has excellent computer interface image simulation and meets the needs of teaching to hearing-impaired students.

# background

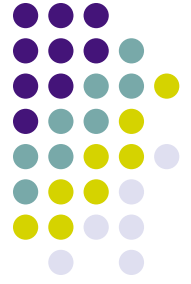
- internal factors
- external factors





# internal factors

- the hearing-impaired high school graduates' level
- 听障学生基本上还停留在形象直观思维阶段in the stage of intuitive thinking
- 逻辑思维、抽象思维能力不强the logical thinking and abstract thinking ability are not good in their learning
- 对程序设计存在着畏难情绪attitude of cowering to computer programming
- 仍有相当一部分同学对基本的程序设计理念理解不透彻a considerable number of students can not have a thorough understanding of the high-level language



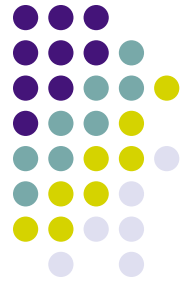
# external factors

- The short history
- Due to the reasons of growth environment
- Language is also an important factor
- The problems existing in teaching, we have not given enough considering to the characteristics of Deaf/Hard of Hearing Students
- Our school's aim is uncertain.



# Our trying

- Improving the entrance exam
- Using multimedia technology
- improving teaching modes and methods, such as culling teaching Content, scattering difficult points, reducing in rank, giving more examples etc.



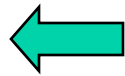
# A result of trying

- These methods solve some problems that exist in teaching
- However, only multimedia technology is not fit for explaining the logical relation in the computer language.
- we introduce simulation technology into the classroom teaching.

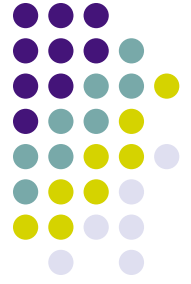


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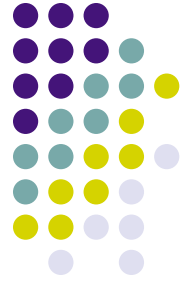


# What is the simulation technology



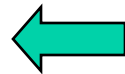
- Robot Simulation normally used for industrial design, and there is no precedent for colleges and universities using it in the computer programming language teaching for hearing-impaired students.
- The simulation technology can translate the logical relation of advanced computer language into the animation process.



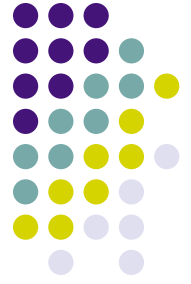


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# How to use the simulation technology



- It has excellent computer interface image simulation, from the point of view of visual compensation. It also meets the needs of teaching to hearing-impaired students.

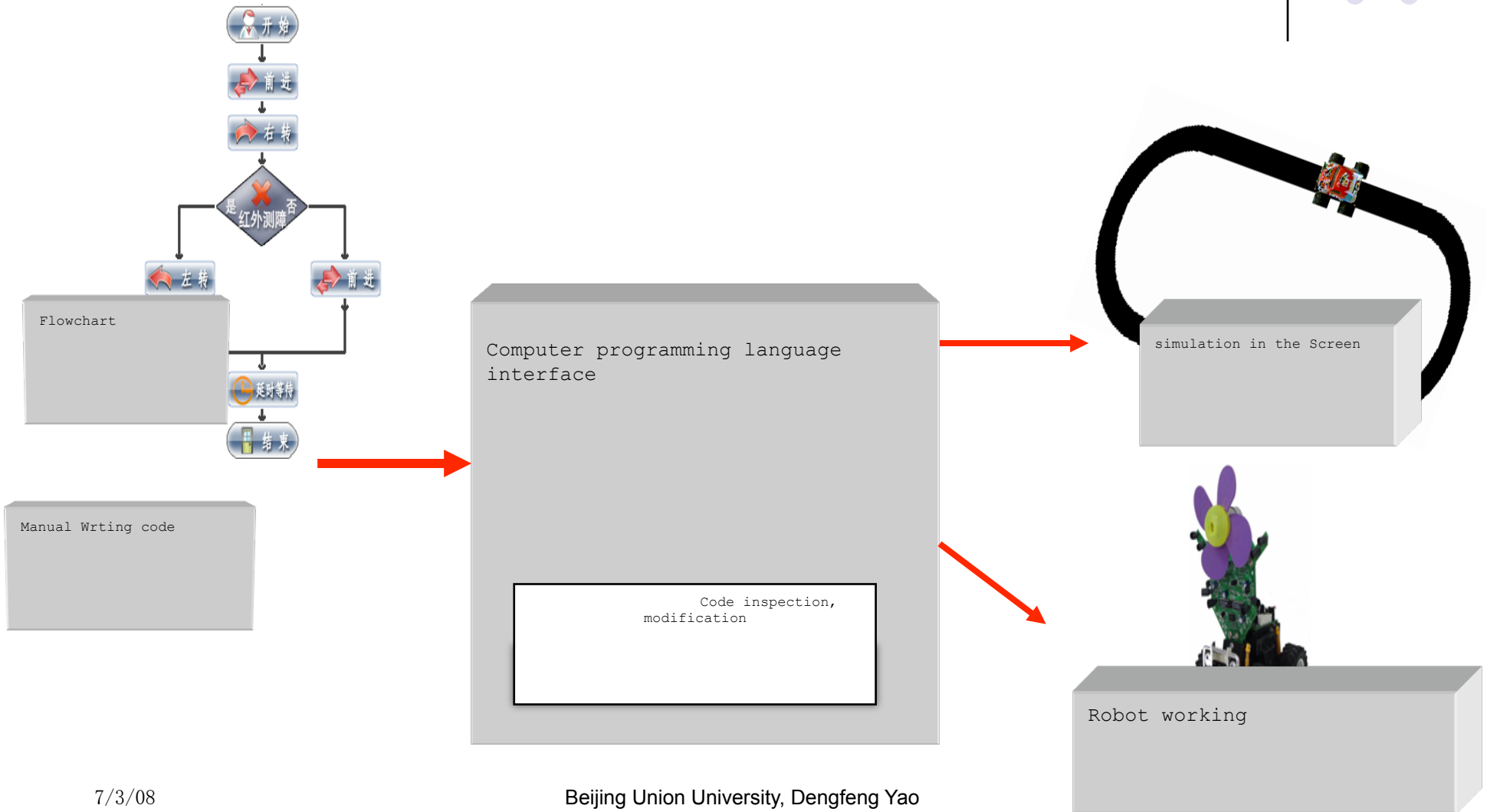
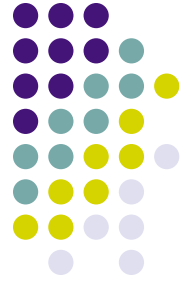


- In order to use the simulation technology, we developed a teaching simulation platform.



- To achieve this goal, we use a new method in teaching, namely, cross learning and practicing to a variety of computer-based teaching language teaching platform. With the use of physical and psychological barriers compensation and skills training methods, the hearing-impaired students have been taught modern technology. Teachers use the platform to solve the "entry difficulty" problem of hearing-impaired students and lead the hearing-impaired students into a new field of study.

# Architecture of the teaching simulation platform

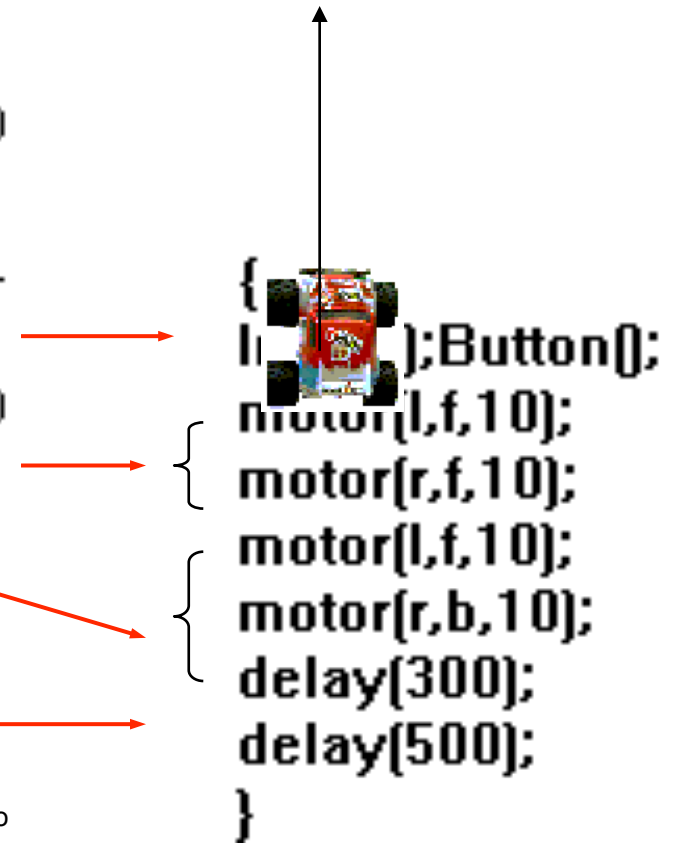




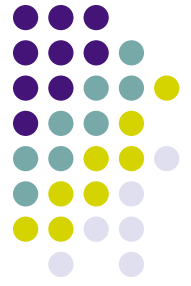
- restructuring the key points and difficult points in a simulation way.

- For example

```
rem 前进  
dirb0=%11100000  
pinb0=0  
pinb0=%00010101  
pause 1000  
pinb0=%00000000  
end
```

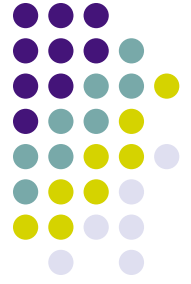


# Development of Simulation Teaching Platform for Deaf/Hard of Hearing Students



- **The translation of C code to simulation**
- **Flow chart editing and data structure**
- **Some design of simulation**

# The translation of C code to simulation



- We designed a simple C language interpretation software



# Flow chart editing and data structure



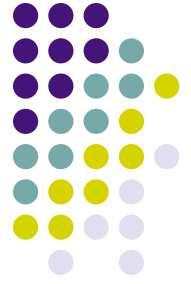
- From that way the C language code, we designed a set of flow chart of the data structure CFlowObj,
- We divide flow chart into three modules
  - the functional module
  - the judgment module
  - the loop module



# Some design of simulation

- we also introduced the concept of delay.
- Also, we joined the port scan of the state in the simulation.





# measures

- We use the computer language learning system to teach in class, with a constructivist teaching method.
- We use the robot simulation laboratory in the experiment.
- We use multimedia courseware of the platform in teaching.



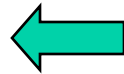
# How to use this platform

- we organize teaching units in a topic way.
- we combine some experience of the national robot match, considering the actual situation of hearing-impaired students in the selecting topics.
- we choose some some simple and practical examples : Robot Hurdle, Robot Finding Tracks(with circle grounds), Avoiding Obstacles and so on. Through these small examples, we transform data structure, the array and pointers into features of the entity.
- It has an overall review and re-understand of the knowledge that students learnt before, improve and train their abilities such as learning and innovation and practical ability, self-management and self-development ability and problem-solving skills.

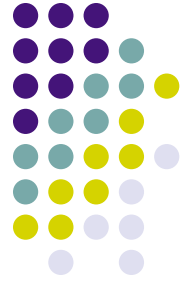


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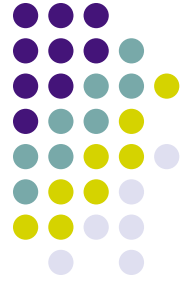


# The advantage of Simulation Platform



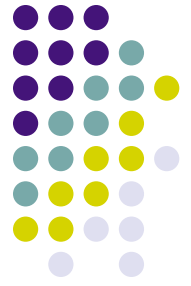
- **improving the quality of teaching and learning**
- **The simulation platform meets with the physical characteristics of hearing-impaired students**
- **achieving the fair higher education.**

# improving the quality of teaching and learning



- in the computer language teaching, adding the computer simulation, students can get best conditions for learning, because of the simulation's visibility, visual and interactive features. As the light, shape, color and moving of a computer simulation directly stimulate the visual of students, it shows good results and the strengthening of the overall effect, and is conducive to the best teaching effect, the quality of teaching is improved[2] These advantages enable hearing-impaired students' education with more and strong visual characteristics, and improving the quality of teaching and learning.

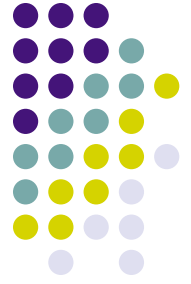
# The simulation platform meets with the physical characteristics of hearing-impaired students



- The simulation platform can create illustrated, colorful, interactive, timely feedback learning environment for the hearing-impaired students.
- Hearing-impaired students can also use it simulate real situations and build self-discipline inside and outside the subject to explore the subject knowledge, application and the exchange.
- The simulation provided by the diversity and comprehensive external stimulation, is effective in mobilizing the synergies of multi-sensory of students without hearing.
- So that hearing-impaired students can explore and discover to complete the whole process of learning in accordance with their choice of cognitive basis of study.



# achieving the fair higher education

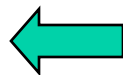


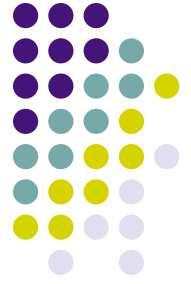
- According to the theory of intellectual diversity, the establishment of a new curriculum system, and the exploring of new teaching methods, could make the exchange of information and communication becomes relatively easy for hearing-impaired students while they are studying. Adding the simulation technology into to the teaching of hearing-impaired students, with the use of modern technology and teaching methods, the hearing-impaired students can enjoy the normal teaching quality as the normal students. It is important for achieving the fair higher education.



# Outline

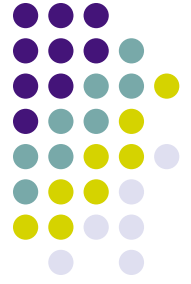
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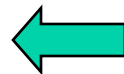
# Existing problems

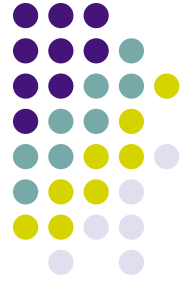
- Reform the shortage of simulation technology
- funding constraints



# Outline

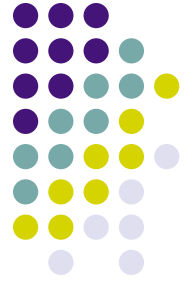
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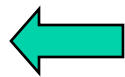
# Summary

- simulation platform is designed to solve practical problems in teaching hearing-impaired students. It also can be used to fit for the hearing students.
- Teaching simulation platform is a open simulation environment.



# Outline

- Our goal
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# Thanks

- Undergraduate Students
  - Li Chao, Zhang Yunxia, Wangxu
- Ministry of Education
- Beijing Municipal Education Committee
- China IBM
- Beijing Federation of the Disabled



- Thank you!