Case Studies in Algorithm Logic for Computer Programming

Donald K. Hsu, Ph.D.
Adjunct Professor, University of Phoenix
Jersey City, New Jersey, USA
&
Associate Professor
Computer Information Systems
Division of Business Administration
Dominican College of Blauvelt
Orangeburg, New York, USA

Abstract

Case studies were done at various MBA universities for 30+ years. These publications and internet searches, added significantly to learning. It is also a good practice to use case studies for undergraduate degree programs. But for the computer logic or programming courses, there were few case studies in the literature.

At University of Phoenix, Algorithm Logic for Computer Programming was taught. C# .NET Programming and Java Programming were given at New Jersey Institute Technology. At Dominican College, International Management and Global E-Commerce were offered. Doing case studies in these courses provided a good foundation for critical thinking, communications, interpersonal, leadership, public speaking and team building skills. Student reviews were good to excellent. This paper gives the summary.

Keyword: Algorithm Logic, C# .NET Programming, Java Programming, Global E-Commerce, International Management, Real-Life Case Studies

Harvard University, Cranfield University, Thunderbird University and others have published case studies for 30+ years. Since 1996, internet is the new paradigm for business and education. Final projects using real-life case studies via internet search, proved to be very successful for learning.

(A) Dominican College*

Dominican College is located 14 miles northwest of New York City. Donald Hsu joined Dominican College in 1988 as an Associate Professor in the Business Division. In Fall Semester of 2013, the College enrolled 2100+ students. The Business Division offers Bachelor of Science programs in Accounting, Computer Information Systems (CIS), and four concentrations of management: Financial Management, Management Information Systems (MIS), International Management (IM), and Marketing Management (MK). A Master's Degree in Business Administration (MBA) was approved by the State of New York in 2008. Hsu served as the

Director of Business Administration Division from 1990 to 1996, and taught courses in CIS, MIS and IM curriculum.

1. MG 355 International Management

In Fall Semester 2013, 25 students enrolled. This course aims to investigate specific issues in the governance of multinational enterprises. Topics include: foundations for international management, managing across cultures, strategic planning, managing political risks, organizing operations, decision making controlling, personnel selection repatriation, training organization development, labor relations, communications, motivating human resources, ethics and social responsibility.

Deresky (2013) wrote the textbook. Accounting, finance, toxic mortgages, ethics, human resource, managing culture, marketing, merger/acquisition, and operations, with an international focus, were covered in details. Students perform in-class team exercises using real-life events from Business Week, Economist, Financial Times, Fortune and Forbes magazine. Four individual homework assignments were collected and graded. One open-book Midterm Exam was given.

For the final projects, students worked in a group of two (one group got three). They employed case studies, on world richest billionaires in Australia, Canada, China, France, Germany, India, Italy, Mexico, Russia, Saudi Arabia, Spain, and Sweden, see Table 1.

2. MG 366 Global E-Commerce

Twelve people registered in Fall Semester 2013. This course was modified to add much internet hardware and software content. One MIS major used this course as a computer elective. The others major in Accounting, Finance, Management or Marketing.

Turban (2012) wrote the textbook. Ebay and Amazon served as examples of the American success stories for E-commerce. Much discussion focused on the business model of: Facebook, Expedia, Freshdirect, JetBlue, Google, Groupon, Hulu, Kickstarter, Linkedin, Netflix, Pandora, Pinterest, Priceline, Tumblr, Twitter, Yahoo, YouTube, and Zynga. Chinese E-commerce firms that traded publicly in USA are: Bidu, Giant Interactive, Netease, Renren, Shanda Games, and Sina. Why are their stock prices going down since the IPO? Is Facebook a good business model? Why is it banned in China? Is Alibaba better? Why is Apple making iPhones and iPads in China? How does Twitter make money? Why is Samsung Galaxy 4 so cool? Are there successful E-commerce in Brazil, India, Russia, and Eastern Europe? Can you start a global E-commerce today and make money? What is the reason that people will pay your product/service online? This type of question keeps the lecture alive and students are challenged to find answers.

In addition, this course covered 7 non-US countries, taking E-commerce to the global level. In the continental Europe, 40+ discount airlines are now operating to benefit travelers. There are 28 countries with 500+ million people in the European Union. Each discount airline started with just one E-commerce website, and tried to be the next RyanAir or EasyJet. Final projects involved the comparison between a discount airline and a traditional airline, covering Czech Republic, Finland, France, Germany, Ireland, and UK, Table 2.

(B) Institute of Electrical and Electronics Engineers**

The Institute of Electrical and Electronics Engineers (IEEE) is a professional association in New York City that is advancing technological innovation and excellence. It has 425,000+ members in 160 countries, with about half of whom reside in the United States.

Since 1993, IEEE North Jersey Section Education Committee has run programming, management and marketing courses to retrain electrical engineers. 303 members and non-members have successfully completed courses in C Programming, C++ Programming, Java Programming, Advanced Java Programming, Project Management, Marketing Research, and C# .NET Programming.

Starting in January 2008, Hsu served as the Chair of Education Committee. George Sierchio was hired to teach Project Management course twice. John Huang taught C#. Hsu was the instructor for all other classes since 1993, Table 3. Working closely with New Jersey Institute of Technology and Fairleigh Dickinson University, courses were offered on evenings or weekends at their campuses, Hsu (2012).

1. C# .NET Programming

In April 2013, C# .NET Programming was offered at New Jersey Institute Technology with 12 registrations. Participants had diverse background – 5 engineering students, 1 project manager, 2 programmers, 3 electrical engineers, and 1 retired professor. Only one of them got knowledge on C#.

Deitel and Deitel (2008) was used as the textbook.   Topics were:

- Compare the enterprise development tools using Java to C# .NET
- Define common language runtime
- Discuss MS Visual Studio .NET Version 2008 and 2010
- Identify C# syntax, data type, control structures
- Distinguish methods, arrays, object-oriented programming
- Build graphical user interface, multithreading, files and streams
- Explain the benefit of using extensible markup language (XML)
- Select database, SQL server, and ADO .NET
- Choose ASP .NET, web forms, web controls, and web services
- Present student Projects

This book got 24 chapters, 1400 pages. It was normally covered in two semesters at a traditional University. Most Computer Science Departments in New York area offered C++, Java or Visual Basic, not C#.

This course was taught on Saturday, 9 am to 1 pm, for six weeks. Covering 20 chapters in six weeks was challenging. Two homework assignments were given and graded. Microsoft C# Express Edition was employed to create, edit and execute the C# programs. With 12 people,

three teams were formed with four people each. Each team was assigned a team leader. They help assisted another for any homework, coding and related issues.

Using C# codes, students worked in a team of two for final projects. Six case studies were done as their final projects: (1) Calculator, (2) Coffee Shop Register, (3) Currency Converter, (4) Fuzzy Dice, (5) 3D Museum, and (6) Table Bill. They presented their C# codes with 10 PowerPoint slides. Some spent 20+ hours doing their projects.

Participants raved about this course. Five people gave public endorsements on Linkedin. One got a job as C# Developer with OpenLink Financial in June 2013, and another one got a job as Java Developer at Tata Consulting Services in July 2013.

2. Java Programming

In July 2013, four people registered for Java Programming course, held at New Jersey Institute Technology. The class ran seven Wednesdays, 6:00 to 9:00 pm.

Horstmann and Cornell (2012) wrote the textbook. Topics included:

- Explain the Java features -- portable, secure, high-performance
- Install the Java development environment
- Define the fundamental programming structures
- Identify objects, classes and inheritance
- Construct interfaces and inner classes
- Analyze graphics programming and event handling
- Learn the user interface components with Swing
- Build applications, applets and generic programming
- Handle exceptions, logging, assertions, and debugging
- Perform collection and multithreading
- Present student projects

Fourteen chapters were covered and two homework assignments were collected. To compile the Java programs, one is to use the DOS platform, by downloading JDK files from Oracle-Java website. Another choice is to use Eclipse software free download. Both worked out well. The NetBean platform did not work. Four case studies were done as their final projects: a) ColorChooser Test, b) Planet Diameters, c) Slider Test, and d) Tree Menu. Student reviews were good.

(C) University of Phoenix**

University of Phoenix (UOP) is a private for-profit institution of higher learning. It has an enrollment of 260,000 students and is the largest private university in USA. UOP was founded in 1976 and is owned by the Apollo Education Group Inc. UOP has 100+ campuses offering 100+ degree programs from associate degrees to PhDs. Its main campus is located in Phoenix, Arizona. The New Jersey campus is located in Jersey City.

In February of 2008, Hsu went through a rigorous 16-hour training session and was certified to teach UOP courses. The training was mandatory for all instructors regardless of prior teaching experience. From May 2008 to December 2013, Hsu taught: Algorithm Logic for Computer Programming, College Mathematics, Creative Mind, Critical Thinking, Essentials of Personal Finance, Information System Security, Integrated Business Topics, Management Negotiations, Marketing, Marketing Research, Organization Behavior, People Science Environment, Public Relations, and Quality Management Productivity, and Research Information Utilization. Hsu taught most of these courses in the past. Six papers were published: a) Marketing Research, Hsu (2006), b) Organizational Behavior, Hsu (2008), c) Critical Thinking, Public Relations and Integrated Business Topics, Schmidt and Hsu (2009), d) Personal Finance, Levit and Hsu (2011), e) Research Information Utilization, Gabriel and Hsu (2013), and f) People Science Environment, Hsu (2013).

PRG 211 Algorithm and Logic for Computer Programming

This course provided a basic understanding of programming development practices. Concepts covered include the application of algorithms and logic to the design and development of procedural and object oriented computer programs to address the problem solving requirements associated with business information systems. This course explained procedural programming concepts including data types, controls structures, functional decomposition, arrays, and files, classes and objects.

The on-campus course at UOP consisted of a five-week, four hours per week schedule. UOP E-Learning website (E-campus) includes the reading assignment for each week and the E-textbooks for students to access. This mechanism saved students time and money.

Ten people enrolled in this course. Two learning teams were formed with five people each. Individual and Learning Team assignments were required every week. The Learning Team placed students to work in a group after class. Table 4 provides the point values for weekly assignments.

In addition to the in-class lecture, students would spend 5 hours or more each week to do Learning Team assignments either virtually or in-person. Adding the 25 hours doing assignments and the lecture 20 hours, give 45 hours for the total time spent on this course.

Hsu presented lectures using the website of four textbooks, Bohl & Ryann (2008), Crews & Murphy (2009), Drake & Venit (2011), and Gaddis (2013). Topics were: understand the process for problem recognition, algorithm development, using a structured modular approach to program development, demonstrate the sequential and selection processing control structure, examine the iteration control structure, apply flowcharts to represent logic unit, explain array structures, define objects and object-oriented classes, apply arrays to program logic and data manipulation, verify algorithms using requirements and desk review design, demonstrate reading and writing sequential files in pseudocode, differentiate between sequential and direct access, compare and contrast procedural and object-oriented programming.

For Learning Team or Individual Assignments, students log on the website of SkillSoft, and access SkillPort, the 24x7 gateway to learning resources for skills improvement, professional development, performance support, and more.

Another tool is Visual Logic software. This is a free download. With Visual Logic installed, students can create the flowchart diagrams, with embedded data. To test the flowchart, click Debug, then Run, the results will be shown. It is a nice tool to transform flowchart statements into executable results. This "hands-on" exercise is essential for learning programming.

There were no PowerPoint slides from these textbooks. So the way to engage students was to cover basic concepts in the first two hours of lecture and ask them the following:

Are there jobs in the IT field? Name the three types of jobs? Answer: Programming, Networking, Database. Give them the job description in each field, salary and number of positions available using CareerBuilder.com, Dice.com, Indeed.com, and other sites. Use Salary.com to find the salary of working at FaceBook, Google, IBM, Verizon.

The course materials for PRG 211 were based upon Visual Basic Programming (VB) language. But few VB jobs existed today. There is an acute shortage of Java, C++ and C# programmers in New York area. Demonstrations of these three programming tools, integrated platforms and projects, were made in class.

Ask students to provide their real-life IT experiences, and to discuss the pros and cons for each issue. Students learned the theory, did the exercises using Visual Logic. They found the salary level for developers/programmers ranged from $50,000 to $120,000. Many of them indicated strong interest to pursue careers in IT.

The two Learning Teams employed real-life case studies to do final projects: one in Calorie Management and the other in Home Maintenance. They submitted their final papers using Visual Logic results and presented them with the PowerPoint slides. Student evaluations averaged 8 out of a maximum of 10, Table 5.

Conclusion

The students learn the theory and need to connect it to the real world. International Management, Global E-Commerce, C#, Java, Algorithm Logic courses were taught at three different firms of higher learning to 63 people. The E-campus infrastructure at University of Phoenix made the E-Learning a pleasure. It is an excellent platform to train tomorrow's leader.

Teaching and learning strategies included the in-class use of Business Week, Economist, Financial Times, Forbes, Fortune, Harvard Business Review, Homework, "hands-on" programming exercises and Internet Search. Final projects involved a written paper and the PowerPoint presentation by a team or an individual. All of these tools and reports attributed to the success in an E-Learning environment. It was a very rewarding experience.

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*Full-Time Position **Part-Time Consultant

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Table 1	MG 355 Final Group Projects	International Management 12/11/2013	
Group A	*Topic*	*Group B*	*Topic*
Busardo	Carlos Slim Helu	Cangiolosi	Amancio Ortega
Constable	America Movil, Mexico	Gore	Zara, Spain
Group C	*Topic*	*Group D*	*Topic*
Mavilla	Li Ka-Shing	Aguirre	Bernard Arnault
Dublis	Hutchison, Hong Kong, China	Jimenez	LVMH, France
Group E	*Topic*	*Group F*	*Topic*
Filho	Stefan Persson	Bulger	Karl Albrecht
Walsh	H&M, Sweden	Chalas	Aldi, Germany
Group G	*Topic*	*Group H*	*Topic*
Fernandez			
Pastrana A	Mukesh Ambani	Sano	Michele Ferrero
Alam	Reliance, India	Signorile	Ferrero, Italy
Group I	*Topic*	*Group J*	*Topic*
Galuska	Prince Alwaleed	Gabbidon	David Thomson
Panague	Kingdom, Saudi Arabia	Trieble	Thomson, Canada
Group K	*Topic*	*Group L*	*Topic*
Perri	Georgina Rinehart	Cortes	Alisher Usmanov
Gallego	Hancock, Australia	Pastrana J	Metalloinvt, Russia

Table 2	MG 366 Final	Europe Airlines	12/12/2013
	Names	*Country*	*Project*
1	McGregor	Germany	Lufthansa
	Walsh		Air Berlin
2	Reyna	Ireland	AerLingus
	Bourke		Ryanair
3	Gallego	France	Air France
	Chisholm		KLM
4	Ginyard	Czech Republic	Czech Airline
	Hueston		Smart Wings
5	Giuliano	Finland	FinnAir
	Veliz		Blue 1
6	Evans	UK	British Airway
	Santana		Easy Jet

Table 3   IEEE North Jersey Section Education Committee

Term Yr	Course Title		Location	No.
Sprg 1993	C Programming		JCPL	27
Fall 1993	C++ Programming		JCPL	25
Fall 2002	Java Programming		BAE System	26
Sprg 2003	Java Programming		Ramada Inn	21
Fall 2003	Advanced Java		Wellsley Inn	9
Sprg 2004	Project Management		HPTI	12
Fall 2004	Project Management		NJBMC	12
Sprg 2005	Marketing Research		NJBMC	6
Fall 2005	Project Management		Elcom	16
Fall 2005	Project Management		NJBMC	12
Sprg 2006	Project Management		NJBMC	7
Sprg 2006	C# .Net Programming		Avtech	14
Fall 2006	Project Management		NJBMC	10
Fall 2006	C# .Net Programming		Avtech	5
Sprg 2007	Project Management		NJBMC	6
Sprg 2007	C# .Net Programming		Avtech	6
Fall 2007	C# .Net Programming		AVTI	6
Sprg 2008	Project Management**		NJBMC	8
Fall 2009	C# .Net Programming		ATM	7
Sprg 2010	C# .Net Programming		NJIT	6
Sprg 2010	Project Management **		NJIT	10
Sprg 2011	Project Management		NJIT	11
Sum 2011	C# .Net Programming*		NJIT	4
Sum 2011	Marketing Research		NJIT	4
Fall 2011	C# .Net Programming		NJIT	3
Fall 2012	Project Management		FDU	7
Fall 2012	C# .Net Programming		NJIT	2
Sprg 2013	C# .Net Programming		NJIT	12
Sum 2013	Java Programming		NJIT	5
Fall 2013	C# .Net Programming		NJIT	2
Fall 2013	Project Management		NJIT	2

**George Sierchio *John Huang

Total enrolled   ====>>>>>   *303*

Table 4 Individual and Learning Team Assignment for University Phoenix
PRG 211 Algorithm and Logic for Computer Programming

<u>*Point Values for Course Assignments*</u>

Individual Assignment: Programming Fundamental paper	6
Individual Assignment: Skillport paper	4
Learning Team Assignment: Charter	3
Learning Team Assignment: Plan for Final Project paper	3
Week Two	
Individual Assignment: Programming Develop Part I	6
Individual Assignment: Visual Logic Practice paper	4
Learning Team Assignment: Skillport paper	4
Week Three	
Individual Assignment: Programming Develop Part II	6
Individual Assignment: Single Iteration paper	4
Learning Team Assignment: Skillport paper	6
Week Four	
Individual Assignment: Programming Develop Part III	6
Individual Assignment: Drug Company paper	4
Learning Team Assignment: Skillport paper	4
Week Five	
Individual Assignment: Direct Access paper	3
Individual Assignment: Final Project Presentation	7
Learning Team Assignment: Final Project paper	10
Individual Participation & Discussion	20
Assignment Totals	
Individual	70
Learning Team	30
Point Total	**100**

Table 5 Student End of Course Survey (SEOCS) of PRG 211

PRG/211
8/28/2013 - 9/25/2013 NJIT0313WN NEW JERSEY
• Survey 1
• Survey 2
• Survey 3
• Survey 4
• Survey 5
• Survey 6
SEOCS results:
On the FACULTY EFFECTIVENESS of **Donald Hsu.**
1) Not at all Likely 0 1   2   3   4   5   6   7   8   9   Extremely Likely 10
How likely are you to recommend this instructor to other students?
Ratings are 0, 7, 10, 9, 9, 10. Average score = 7.5 or 8.0
----
2) Not at all Helpful 0 1   2   3   4   5   6   7   8   9   Extremely Helpful 10
How helpful was the feedback this instructor provided on assignments you turned in during this course?
Ratings are 0, 8, 10, 9, 10, 10. Average score = 7.8 or 8.0
----
3) Comments on the Faculty:
None