Teaching and Learning Scheme: for the Degree of Bachelor of Science with the Major: Computer Science/Information Technology/Computer Application(Regular)/ Computer Application (Vocational)/ Data Analytics

(Three Years- Six Semesters Bachelor's Degree Programme)
(Four Years- Eight Semesters Bachelor's Degree Programme (Honors)
(Four Years- Eight Semesters Bachelor's Degree Programme (Honors with Research)

Preamble
The new curriculum of the four-year undergraduate program under NEP, for Computer Science aims to develop the core competence in computing and problem solving amongst its graduates. Informally, "Learning to learn" has been the motto of the department since its inception. The curriculum thus focuses on building theoretical foundations in Computer Science to enable its pupils to think critically when challenged with totally different and new problems. It imbibes the following **Student-Centric** features of NEP2020:

Flexibility to Exit:
In order to support early exits, the curriculum aims to develop employability skills early. This has been done so that the outcomes of the 4 yr degree is not compromised as we believe that all but a few students will go for the full 4-year degree. As programming is at the heart of computing it is proposed to have two programming courses early so that the students can develop good programming skills in the first year. At the same time students are familiarized with the hardware of computers early on.

Employability:
Industry demand in the IT sector has changed considerably in the past few years. With the humongous amount of data coming from all the domains like medical data, social networking data, astronomical data, education, etc., automating information extraction and analysis of data is the only way forward to leverage the available data for the future. The curriculum aims to equip the students with tools and techniques of Artificial Intelligence, Machine Learning and a pathway on Data Science if the student so desires. Having said this, there is no replacement for the foundational courses like programming, data structures and algorithms. With two courses on programming and three courses on data structures and algorithms together, a strong foundation will be laid down for problem solving.

Research:
With the option to obtain specialization in an area of their choice, the curriculum prepares the students to take up research projects in their final year.

Program Outcomes:
Knowledge outcomes: After completing B.Sc. Computer Science Program students will be able to:
PO1: To develop problem solving abilities using a computer.;
PO2: To prepare necessary knowledge base for research and development in Computer Science.
Skill outcomes: After completing B.Sc. Computer Science Program students will be able to:
PO3: To build the necessary skill set and analytical abilities for developing computer-based solutions.
PO4: To train students in professional skills related to Software Industry.
Generic outcomes: Students will
PO5: Augment the recent developments in the field of IT and relevant fields of Research and Development.
PO6: Enhance the scientific temper among the students so that to develop a research culture and Implementation the policies to tackle the burning issues at global and local level.

Program Specific Outcomes
PSO1: Students get knowledge and training of technical subjects so that they will be technical professional

by learning C programming, Relational Database Management, Data Structure, Software Engineering, Graphics, Java, PHP, Networking, Theoretical Computer Science, System programming, Object Oriented Software Engineering.

PSO2: Students understand the concepts of software application and projects.

PSO3: Students understand the computer subjects with demonstration of all programming and theoretical concepts with the use of ICT.

PSO4: Development of in-house applications in terms of projects

PSO5: Students will build up programming, analytical and logical thinking abilities.

PS06: Aware them to publish their work in reputed journals

PS07: To make them employable according to current demand of IT Industry and responsible citizen.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109201/ 110201/ 112201/123200/ 134201	**Programming with C**	2	30	2 Hrs	30

Course Objectives:	1.To provide students with understanding of code organization and functional hierarchical decomposition with using data types. 2. Programming is about writing the instructions which a computer follows to enable it to store knowledge, process knowledge, and communicate knowledge with the outside world.
Course Outcomes:	On competition of the following syllabus the students will be able to - 　　1. Understand the Programming concepts. 　　2. Understand development of C language. 　　3. Write Algorithms for the task/problem. 　　4. Able to design flowcharts of the problem. 　　5. Able to write Simple C Programs.

Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Algorithm, flowcharting, Types of programming languages. History of C language, Advantages, Structure of C program, Character set, Identifiers, Keywords, Constants and Variables, Symbolic constants, Qualifiers, Type conversion. Operators and Expressions	8 Hrs	8 Marks	The students have a problem understanding the concept of arrays, dealing with the syntax of the language, designing the organization of the program and understanding the concept of flow control such as looping and branching or function calls.
Unit II	**Formatted I/O:**scanf(), printf(), **Unformatted I/O** : getch(), getchar(), gets(), putch(), putchar(), puts(). **Control structures:** Branching: if, if-else, Conditional operator(? :), nested if, switch. Looping: while, do-while, for statements, comma operator, goto, break, continue, nested loops	7 Hrs	7 Marks	1. To help solve this problem we have divided the various concepts and used different examples in day to day life.
Unit III	**Arrays** - Declaration and initialization of one and two dimensional array. **Structure** - Definition, declaration, initialization, array of structure, nested structure, union. **Pointers** - Declaration, initialization, pointers arithmetic	8 Hrs	8 Marks	2. The Necessity Of Teaching Reform: The final goal of programming teaching is making the students mastering the ability of coding and debugging.
Unit IV	**Functions in C**: Definition of function, function prototype, categories of function, actual argument, formal argument, function calling: call by value, call by reference, function parameters, local and global variable, functions with array, function recursion. **String functions** - String functions :strlen(), strcpy(), strcmp() &strcat()	7 Hrs	7 Marks	3. Chalk and Board method. 4. Power point presentation with animation. 5. Use of online software to explain the coding and debugging.
References:	**Text books:** Programming in C: E Balagurusamy : TMH Publication. **Reference Books:**			

	1) ANSI C- Dennis Ritche
	2) Programming in C - V.Rajaraman
	3) Programming with C: Venugopal K.R. TMH, Publication.
	4) Programming with C: Byson Gottfried , Schaum Series Publication.
	Weblink to Equivalent MOOC on SWAYAM if relevant:
	• https://onlinecourses.swayam2.ac.in/cec19_cs06/preview
	• https://onlinecourses.swayam2.ac.in/nou20_cs03/preview
	• https://www.classcentral.com/course/swayam-computer-fundamentals-13950
	• https://onlinecourses.nptel.ac.in/noc19_cs42/preview
	• https://onlinecourses.swayam2.ac.in/aic20_sp06/preview
	• https://onlinecourses.swayam2.ac.in/cec20_cs02/preview
	• https://www.classcentral.com/course/swayam-introduction-to-programming-in-c-2486
	• https://swayamprabha.gov.in/asset/new_team/images/course_files/R12-Introduction%20to%20Programming%20in%20C%20.pdf
	Weblink to Equivalent Virtual Lab if relevant:
	• https://www.programiz.com/c-programming/online-compiler/
	• https://www.onlinegdb.com/online_c_compiler
	• https://www.tutorialspoint.com/compile_c_online.php
	Any pertinent media (recorded lectures, YouTube, etc.) if relevant:
	• https://www.youtube.com/watch?v=eEo_aacpwCw
	• https://www.youtube.com/watch?v=OGM2BJ29Syg
	• https://www.youtube.com/playlist?list=PLWPirh4EWFpF_2T13UeEgZWZHc8nHBuXp
Model Questions:	**Short Type (At least 8):**
	1. What do mean by Algorithm?
	2. Define a flowchart.
	3. What is means by program?
	4. Define keyword.
	5. Define Identifier.
	6. Define an Array.
	7. Define Structure.
	8. Define Union.
	9. What is a function?
	10. What is String?
	Long Type (At least 4)
	1. Describe the structure of C program.
	2. Explain the looping structures in C with suitable example.
	3. Describe Union and its use in C with example.
	4. Illustrate Prototype of function with example.
	5. Illustrate pointers with example
	MCQs:
	1. Which of the following language is the predecessor to C Programming Language?
	a) A
	b) B
	c) BCPL
	d) C++
	Ans: c
	2. C programming language was developed by
	a) Dennis Ritchie

b) Ken Thompson
c) Bill Gates
d) Peter Norton
Ans: a

3. C was developed in the year ___
a) 1970
b) 1972
c) 1976
d) 1980
Ans: b

4. C is a ___ language
a) High Level
b) Low Level
c) Middle Level
d) Machine Level
Ans: c

5. C language is available for which of the following Operating Systems?
a) DOS
b) Windows
c) Unix
d) All of these
Ans: d

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109202/ 110202/ 112202/ 123202/ 134202	**Laboratory on Programming with C**	2	60	4Hrs	50

Course Objectives:	1. Understand the concept of C programming 2. Know the importance of Looping Statement. 3. To implement decision making structure 4. To develop proficiency in Functions
Course Outcomes:	On competition of the following syllabus the students will be able to - 1. To design simple C Program. 2. To design program for implementing looping structure. 3. Ability to use function. 4. Skill in structuring code with function.

Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
1. Write a program in 'C' to demonstrate Arithmetic Operations. 2. Write a program in 'C' to demonstrate If -Else Statement. 3. Write a program in 'C' to demonstrate Nested If Statement. 4. Write a program in C to demonstrate Switch-case Statement. 5. Write a program in 'C' to demonstrate For Loop Statement. 6. Write a program in 'C' to demonstrate While Loop Statement. 7. Write a program in 'C' demonstrate Do-While Loop Statement. 8. Write a program in 'C' demonstrate Nested Loop. 9. Write a program in 'C' demonstrate One-Dimensional Array. 10. Write a program in 'C' demonstrate Two-Dimensional Array. 11. Write a program in 'C' demonstrate String Functions. 12. Write a program in 'C' demonstrate Structure. 13. Write a program in 'C' demonstrate Pointers. 14. Write a program in 'C' demonstrate Function. 15. Write a program in 'C' demonstrate Function Recursion.			

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109503/ 110503/ 112503/123503/ 134503	**E-Business**	2	30	2 Hrs	30

Course Objectives:	1. To understand how C++ improves C with object-oriented features 2. Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects. 3. To learn the syntax and semantics of the C++ programming language. 4. To learn how to design C++ classes for code reuse. 5. Perform programming on functions, inline functions, constructor and destructor. 6. Perform programming on the concept of function overloading, operator overloading, virtual functions and polymorphism.
Course Outcomes:	On competition of the following syllabus the students will be able to- 1. Define and identify the fundamental knowledge about object-oriented programming. 2. Declare and describe the concepts of abstraction, encapsulation, inheritance and polymorphism. 3. Implement Object Oriented Programming Concepts in C++. 4. To be able to develop applications in C++. 5. Demonstrate employability skills through the development of programming projects.

Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	In corporation of Pedagogies
Unit I	**Introduction to E-Commerce:** Introduction, E-Commerce – Definition, History of Ecommerce, Online Extension of a BAM Model, Transition to E-Commerce in India, E-Commerce v/s Traditional Commerce, E - Commerce v/s E - Business. Electronic Commerce – Cutting Edge Technologies, Strengths, Weakness, Opportunities and Challenges of E-Commerce, Components of E-Business	8 Hrs	8 Marks	
Unit II	E-Commerce Business models – B2C, B2B, C2B, C2C, B2G, C2G., Brokerage, Advertising, Infomediary, Merchant, Manufacturer (Direct), Affiliate, Community, Subscription, Utility. Ecommerce Business Revenue Models & Types, Impact of E-Commerce on business, Successful Business Models in India. **Hardware and Software for E-Business:** Web Servers – Browsers – Server Software– Web Authoring Tools - Database System - World Wide Web – Domain Name – Hardware requirements, Brief on Shopping Cart, Point of Sale, Wireless Payment Device,	7 Hrs	7 Marks	
Unit III	**EDI:** Electronic Data Interchange (EDI): Meaning & Definition, History & Evolution, Uses, EDI Standards, EDI	8 Hrs	8 Marks	

	Working Concept, Implementation difficulties of EDI, Financial EDI, EDI and Internet, EDI services Introduction to E-Commerce: Introduction, E-Commerce – Definition, History of Ecommerce, Online Extension of a BAM Model, Transition to E-Commerce in India, E-Commerce v/s Traditional Commerce, E - Commerce v/s E - Business. Electronic Commerce – Cutting Edge Technologies, Strengths, Weakness, Opportunities and Challenges of E-Commerce, Components of E-Business			
Unit IV	E-Commerce Business models – B2C, B2B, C2B, C2C, B2G, C2G., Brokerage, Advertising, Infomediary, Merchant, Manufacturer (Direct), Affiliate, Community, Subscription, Utility. Ecommerce Business Revenue Models & Types, Impact of E-Commerce on business, Successful Business Models in India.	7 Hrs	7 Marks	

References:	▪ Kalakota Ravi and A. B. Whinston : Frontiers of Electronic Commerce, Addison Wesley ▪ Raydu – E Commerce, HPH ▪ Agarwala K. N. and DeekshaArarwala : Business on the Net – Bridge to the online store front, Macmillan, New Delhi. ▪ Agarwala K.N and DeekshaArarwala: Business on the Net – Whats and Hows of E-Commerce.

Model Questions:	**Short Type** 1] Explain history of E-commerce in detail. 2] Explain BAM model. 3] Compare E-commerce v/s Traditional Commerce 4] Explain Business Revenue Model. 5] Explain Brokerages, Advertising. 6] Explain Web server , Web Browsers 7] Explain Wireless Payment Devices 8] Explain Meaning & Definition of EDI 9] Explain EDI Standards. 10] Explain EDI Services. **Long Type** 1] Explain Components of E-Business in detail. 2] Explain in detail Impact of E-Commerce on business. 3] Explain Hardware and Software for E-Business in detail. 4] Explain Definition, History & Evolution of EDI. 5] Explain Implementation difficulties of EDI in detail.

MCQs for Internal Assessment

1] The dimension of e-commerce that enables commerce across national boundaries is called _____.
A. interactivity.
B. global reach.
C. richness.
D. ubiquity

ANSWER: B

2] Which one of the following is not one of the major types of e-commerce?
A. C2B.
B. B2C.
C. B2B.
D. C2C.

ANSWER: A

3] A _____ is the set of planned activities designed to result in a profit in a marketplace.
A. business model.
B. profit model.
C. business plan.
D. revenue model.

ANSWER: A

4] Which of the following was the first commercial Web browser?
A. Mosaic.
B. Mozilla.
C. Netscape Navigator.
D. Internet Explorer
ANSWER: C

5]The largest component of a Web site budget is_____.
A. system maintenance.
B. system development.
C. content design and development.
D. telecommunications.

ANSWER: A

6] The underlying computing equipment that the system uses to achieve its e-commerce functionality iscalled a _____.
A. hardware platform.
B. content platform.
C. transaction platform.
D. scalability platform.
ANSWER: A

7] E-commerce merchant server software includes all of the following except_____.
A. online e-mail.
B. online catalog.

C. online shopping cart.
D. online credit card processing.
ANSWER: A

8] The only payment system that is instantly convertible without intermediation is
_____.
A. Credit card.
B. Accumulating balance.
C. Stored value.
D. Cash.

ANSWER: D

9] The most prevalent online payment method is _____.
A. PayPal.
B. checks.
C. credit cards.
D. debit.
ANSWER: C

10] E-business can be defined as_____.
A. the uninhibited flow of information and goods on the Web.
B. the use of the Internet and the Web to transact business.
C. digitally enabled transactions and processes within an organization.
D. commercial transactions involving electronic goods.
ANSWER: C

11] Which of the following represents a limiting factor for the growth of e-commerce?
A. Persistent cultural attraction of physical markets and traditional shopping experiences.
B. Inadequate selection of goods compared to physical marketplaces.
C. E-commerce lacks the convenience of other methods of transacting business.
D. The potential audience for e-commerce is too low to support it as a widespread method
of commerce.
ANSWER: A

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109504/ 110504/ 112504/123504/ 134504	**Website Design Principles**	2	30	2 Hrs	30

Course Objectives:	• To have an understanding of the introductory Internet and World Wide Web concepts. • To be able to configure text, color, and page layout with Cascading Style Sheets. • To have an understanding of configuring images & multimedia on web pages. • To have an understanding of some advanced technologies of web. • To develop the skill & knowledge of Web page design using HTML5.
Course Outcomes:	As per Blooms Taxonomy (4 to 6)

Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	In corporation of Pedagogies
Unit I	Internet : History, Application, World Wide Web, Web Standards, Basics in Web Design: Multitier Application Architecture,Client-Side Scripting versus Server-Side Scripting,World Wide Web Consortium (W3C). History of HTML, Introduction to HTML Tags and Attributes	8 Hrs	8 Marks	
Unit II	**HTML5**: Features, Editing,First HTML5 Example,Headings, Linking, Images, Lists, Tables, HTML-Iframe. **HTML-Form:**<input><textarea><button><select><label>	7 Hrs	7 Marks	
Unit III	**CSS:** Benefits of CSS, CSS Versions History, CSS Syntax, CSS Properties. **Selectors:** universal, type, id, class. Inline Styles Embedded Style Sheets, External Style Sheets.	8 Hrs	8 Marks	
Unit IV	**Introduction to scripting**: Java Script basics, operators, data types, popup boxes. Control structures: if, If-else, Switch. Looping structures: for, do-while, while.	7 Hrs	7 Marks	
References:	1. Paul Deitel, Harvey Deitel and Abbey Deitel, "Internet & World Wide Web: How to program", Fifth Edition Pearson ISBN 978-0-13-215100-9 2. Thomas A. Powell, "HTML & CSS: The Complete Reference", Fifth Edition, McGraw-Hill, ISBN: 978-0-07-174170-5 3. Kogent Learning Solutions Inc, HTML5 Black Book: Covers CSS3, Javascript, XML, Dreamtech Press, New Delhi, 2011 4. Jeffery C. Jackson, "Web Technologies", A Computer Science Perspective, Pearson Education

Short Type

1] Explain history of Internet in detail.

2] Explain Multitier Application Architecture.

3] Compare Client-Side Scripting versus Server-Side Scripting.

4] Explain World Wide Web Consortium (W3C).

5] Explain Headings tags of HTML.

6] Explain <input> tags with example.

7] Explain benefits of CSS.

8] Explain syntax of CSS.

9] Explain JavaScript operators.

10] Explain JavaScript data types.

Long Type

1] Explain Client-Side Scripting versus Server-Side Scripting with its pros and cons.

2] Explain in detailHTML Tags and Attributes in detail.

3] Explain Image tag in detail.

4] Explain Table tag in detail.

5] Explain Internal and external CSS with explain.

6] Explain looping and conditional statements in javascript in detal.

MCQs for Internal Assessment

1]What is HTML?

a) HTML describes the structure of a webpage

b) HTML is the standard markup language mainly used to create web pages

c) HTML consists of a set of elements that helps the browser how to view the content

d) All of the mentioned

Answer: d]

2] Who is the father of HTML?

a) RasmusLerdorf

b) Tim Berners-Lee

c) Brendan Eich

d) Sergey Brin

View Answer

Answer: b

3] HTML stands for _____

a) HyperText Markup Language

b) HyperText Machine Language

c) HyperText Marking Language

d) HighText Marking Language

View Answer

Answer: a

4] Which of the following is used to read an HTML page and render it?

a) Web server

b) Web network

c) Web browser

d) Web matrix

View Answer

Answer: c

5]Which of the following HTML tag is used to create an unordered list?
a)
b)
c)
d) <ll>
View Answer

Answer: b

6] Which of the following HTML tag is used to add a row in a table?
a) <th>
b) <td
c) <tr>
d) <tt>
View Answer

Answer: c

7] Which of the following extension is used to save an HTML file?
a) .hl
b) .h
c) .htl
d) .html
View Answer

Answer: d

8] What is CSS?
a) CSS is a style sheet language
b) CSS is designed to separate the presentation and content, including layout, colors,
         and fonts
c) CSS is the language used to style the HTML documents
d) All of the mentioned
View Answer

Answer: d

9] Which of the following CSS selectors are used to specify a group of elements?
a) tag
b) id
c) class
d) both class and tag
View Answer

Answer: c

10] Which of the following CSS selector is used to specify a rule to bind a particular
         unique element?
a) tag
b) id

c) class
d) both class and tag
View Answer

Answer: b

11] What is JavaScript?
a) JavaScript is a scripting language used to make the website interactive
b) JavaScript is an assembly language used to make the website interactive
c) JavaScript is a compiled language used to make the website interactive
d) None of the mentioned
View Answer

Answer: a

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109603/ 110603/ 112603/123603/ 134603	**Laboratory on E-Commerce**	2	60	4Hrs	50

Course Objectives:	5. To provide students with understanding of E-Commerce. 6. Importance of E-Commerce in the current business. 7. How to process E-Commerce and communicate knowledge with the outside world.
Course Outcomes:	On competition of the following syllabus the students will be able to - 1. Understand the complexity of e-Commerce and its many facts. 2. Explore how e-business and e-commerce fit together. 3. Apply the Knowledge to perform E-Commerce transactions. 4. Identify the impact of e-commerce. 5. Recognize the benefits and limitations of e-commerce

Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Visit E-Commerce Website 2. B2B e commerce. Give an example for this. 3. Define B2C e commerce. Give an example for this. 4. Define C2B e commerce. Give an example for this. 5. Define C2C e commerce. Give an example for this. 6. Give any 2 applications of e commerce. 7. Perform digital marketing, Edit Basket of purchase. 8. Visit the e-Commerce site register yourself as client. 9. Visit the e-Commerce site register yourself as client and change the address of client. 10. Illustrate the B2B, B2C with example.			1. Demonstration of execution of purchasing goods. 2. On line Visit to websites. 3. Demonstration of how to register and use e-Commerce website.
References:	**Weblink to Equivalent MOOC on SWAYAM if relevant:** • https://www.bigcommerce.com/articles/ecommerce/best-ecommerce-website-design/ • https://www.coursera.org/learn/ecommerce-academy • https://www.coursera.org/learn/foundations-of-digital-marketing-and-e-commerce.			

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109604/ 110604/ 112604/123604/ 134604	**Laboratory on Web Publishing**	2	60	4Hrs	50

Course Objectives:	1. Understand the concept of Webpage/site 2. Know the importance of web publishing. 3. Explain the functions of web publishing. 4. Define the scope and benefits and limitations of web publishing.			
Course Outcomes:	On competition of the following syllabus the students will be able to - 1. To design simple web page. 2. To design web page with login id. 3. To create web page/site. 4. To publish the website.			

Contents		**Workload Allotted**	**Weightage of Marks Allotted**	**Incorporation of Pedagogies**

	List of Practical:
	1. Create a web page of your name usingvarious heading tags.
	2. Design a web page according to the format given below using heading tagwith your name displayed on the top. Creating a web-page using \<p> tag
	3. Design a web page describing yourself using single and multilinecomments. Also use \
	 tag.
	4. Create a html file for displaying a webpage with below mentioned tags.
	  a. Bold
	  b. Italics
	  c. Underline
	  d. Alignment
	  e. Paragraph
	5. Create a html file for displaying a webpage with below mentioned tags:
	  a. Text color
	  b. Headings
	  c. HR
	  d. Background color
	  e. Line break
	6. Design a web page of your CV with headings as objective, educationalqualification, achievements, strengths, hobbies and personal details.
	  a. Insert a horizontal line after every above-mentioned heading
				1. Demonstration of execution of tags.
				2. On line Visit to websites.
				3. Demonstration of how to register and publish the web site.

	b. Set any light color as page background.
	c. Bold and underline every heading 4. Use heading tag to specify the heading
	d. Use pre tag for Educational Qualification.
	7. Create a html page which shows the following list apply the followingparts:
	  a. Put horizontal line after newspaper and magazine.
	  b. Apply heading tag for newspaper and magazine.
	  c. Apply a background color
	8. Create a webpage to show the use of lists with type.
	9. Design a web page to display the names of Beverages, Dishes and Dessertsusing unordered lists:
	10. Design a web page to display the different courses available in yourinstitute. Show the use of different types of ordered lists.			

	Weblink to Equivalent MOOC on SWAYAM if relevant: • https://www.youtube.com/watch?v=8RT4n8KGjfE • **http://tinyurl.com/mtjx8pnw** • https://www.youtube.com/watch?v=qiR-7fL-I2A • http://tinyurl.com/y84uddwa			