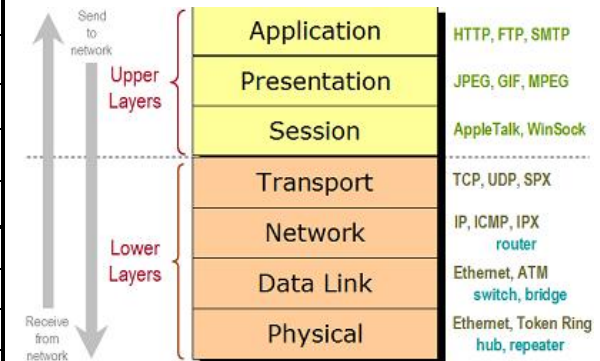


Compulsory A: Information Processing

2. Data Organization and Control	Data Source Error; Transcription Error; Transposition Error;				← Cannot be detected by Validation programs		
	Types of data control: Data Validation; Data Verification						
	Data Validation	Field presence		Format:		Email	Skill:
		Field length		Type:		Name	
		Range		Check digit			
		Fixed value		Parity check			
	Data verification	Input data twice:		Passwords		Errors / Check: Ans. Both Type & specific error/check	
Double data entry:		Two people					
Confirmation:		Read once					
3. Encoding	Two's complement: Flip, +1		One's complement: Flip		K: 1024: File size		
	Sign and magnitude: Double zero, wasted space: Left is sign				k: 1000: Speed		
	Overflow: Unsigned: Number exceed no of bits				OS: 2; Manufacturer: 10;		
	Signed/Two's complement: Check ± is correct				RMB read <b>no. of bits</b>		
	Character Systems	Bits	Character Systems	Bits	Conversion program		
	Unicode	8-32	Extended ASCII	8	Change encoding system of web browser		
	Big5	16	Standard ASCII	7	Skill: Write system (10 <sub>10</sub> )		
4. Multimedia Elements	Graphics: Resolution, Color depth, Compression method				File size calculation corr. to 1dp		
	Audio: Bit resolution, sampling rate, channels						
6. Word Processing	Video: Frame size, Frame rate, Duration, [Refer to Graphics]						
	Factors: Bitrate > Downloading speed; Uploading time; System compatibility;						
	DOC TXT RTF PDF:		Compatibility; Edit; Formatting;		PDF need special reader		
	Wrap Text	Left/Right/Center Align/Fully Justified			Margins	Compatibility	
	Columns: Read faster, more space		Hyphenation		Publishing software (InDesign)		
	Mail merge: Avoid errors, save time → Object Linking				OCR: Words; OMR: MC Ans Sheet		
	Content page: Must have Heading Styles, NOT Auto Update, must Generate						
7. Excel / Spreadsheet	No %; Use MOD		LEFT(A1, X): First X Characters		Conditional formatting:		
	Range:		MID (A1, X, Y): Start from X, Y characters		Case + Output result		
	=Sh2!\$A\$1:\$F\$4		FIND ("K", A1, X): Index of K where K ≥ X		Update <b>all</b> worksheets		
	VLOOKUP: Look down first, then horizontal			(Query, Range, Result		= IF(1>2, "M", "F")	
	HLOOKUP: Look right first, then vertical			column/row, approx?)		Remember =	
	General; Currency; Date; Time; Fraction; Scientific;				COUNTA: Count unblank		
	Charts: Bar; Line; Pie; Scatter;				Sort; Filer; What-if analysis;		
8. Database	COUNTIF: Range, criteria						
	Not store age: Change every year; Store DOB instead				DBMS: Create/Modify/Delete table		
	Sort: Permanent		Filter: 1 table;		Add/Delete/Modify record		
	Query: 2+ tables						
	Key field: Unique, mandatory/non blank				Index: small file containing index keys, 1 table		
	Data redundancy: Consume more space and computational power		Solution: Make a new table to store repeated data, must have a key field to join together				
	Data types: Text, Number, Date/Time, Currency, AutoNumber, Boolean						
	Input mask:		Prevent users from inputting invalid data		Check leading zeros Int→ Text		
	Forms:		GUI to manipulate and display data from 2+ tables, validation/verification				
9. OLE	Report:		Print data in a professional and easy way, predefined format, reusable				
	SELECT COUNT(*) AS cc FROM table WHERE col=sth ORDER BY col2 DESC GROUP BY col2;						
	Object linking		Adv: Auto update; Dis: Rely on source file		CSV/TXT/DOC/DBF/XLS		
10. PPT	Object embedding:		Adv: No source file; Dis: No auto update		Server: Excel		
	Link: Open in active app. window		Emb: Corrsp. new window		Client: Word		
10. PPT	Presenting information: Lists, Table, Chart, Graphical Presentation				Audience/Content		
	Multimedia: Text, Graphics, Audio, Video/Animation				Charts (Type of chart)		

Compulsory B: Computer System Fundamentals	11. CPU	ALU: Logic, Arithmetic   Register: Storage for CU ALU Store data of calculation in AX				Registers: GPR: (ABCD X)		Accumulator; Base Register; Counter; Data Register;	
		CU: Keep track of sequence of instructions Fetch from RAM, Decodes, Execute (instructs) ALU						Contain inst. to be exec.	
		Bus: Control various components of system Data/Address/Control ← Direction, Timing Bus width: More data TRANSMITTED			Transfer data from RAM CPU	Instruction		Mem. address of next inst.	
						MAR	Data Address	RMB Write all bits when ans content!	
		Word Length: No. of bits of data process at once → More data can be processed, More complex inst.			Status		Zero, Sign, Overflow, Carry		
					Flag bits show specific status after ins. exec.				
		SRAM [Cache] / DRAM: Super/Dumb RAM				ROM: BIOS / Bootstrap, Manufacturer, firmware			
		Clock rate: Hz		CMOS: Config; Involatile		Save current process state → handle interrupt → resume operation of inst.			BIOS: Hardware
	Cycle, Assembly		Interrupt: Handle imm →		Bootstrap: Soft				
	12. I/O Devices	Keyboard Mouse Microphone Webcam Touchscreen Speakers						Bar Code/Optical mark reader	
		Monitor, Projector, Scanner:				Resolution, Dot Pitch, Contrast, Ratio, Pixels, Lumens			
		LCD: Slim, Clear, Low power consumption				CRT: Cheap, High contrast ratio, Higher refresh rate			
		Printers:	Laser	↑ \$, ↑ Printing speed		Thermal	↓ \$	Receipt	Commonly seen in kiosk
			Inkjet	↓ \$, ↑ Quality Color		Dot Matrix	↓ \$	Credit Card	
	Plotter		↑ \$, ↑ Quality, Large		USB Driver: Embedded in the USB, install automatically				
	13. Secondary Storage Devices	1. CPU issues a read instruction to hard disk 2. Hard disk loads data into the main memory 3. Main memory loads data to CPU				SSD: Flash mem.	Faster read/write speed		Shock resistant
							Faster access time		↓ Power consumption
						Cache: Store frequently/recently used data RPM: Revolutions per minute Access time: Time to search and read data Data transfer rate: MB/s Seek time: Time move R/W lead on right track			
		More Expensive; Smaller storage capacity							
		HDD:	Platter / Track / Cylinder						
		Hard disk: Direct access mode Magnetic tape: Sequential access mode Storage medium: Magnetic: HDD   Optical: CD/DVD   Semiconductor: SSD				Size smaller: Old BIOS / Manufacturer use denary			
						Volatile / Involatile: Lose data when power off or not			
						NAS/SAN/Cloud storage   RMB Specify the subject			
	14. Software	System software:		Coordinate operation of all computer hardware, manage system resources					
		OS:	Device configuration, File management, Memory management, Interface platform, Network communication management						
			Network/Desktop/Mobile OS						
		Online: X installation, up to date		Offline: X depend on connection, sec., resp time					
		Utility:	Designed to enhance an OS to do a system task. Backup, Data recovery, File manager, Anti virus, Program uninstaller, Compressor, Disk scanning/defragmenter, System/Activity monitor						
		Driver:	Allow device to communicate with OS, UI for setting, extra functionality						
	Application software:		Productivity, Communication, Multimedia, Entertainment, Education						
	15. Systems	Expansion slot	RAM, Network card [PCIE]			Parallel	Printer		
		Ethernet	Router/Networking			Serial	Scanner		
		6 audio ports	Provide 5.1 surround sound			PS/2	Keyboard/Mouse		
		Network computer: Kiosk: Smaller HDD, Less extensibility, Smaller size, Cheaper, Less power							
		Mainframe: Large, control other computers, connected to network, control kiosk, Power supply							
		Supercomputer: Complicated calculations: e.g. Weather forecast [Multi Processing / Home CPU]							
Multi user: Server, Online system				Multi tasking: Time slicing		Multi threading: Split slice			
Online interactive: Google; Diff output				Real time: Process data immediately after input: ATM					
Batch: Produce multiple items at once   Schedule tasks when not peak, fully utilize resources]									
Distributed:		Diff. location		Split tasks to network → Collect results [Low cost] [Unreliable], BT					
Parallel:		Divide program into multiple processes, high degree of pipelining, Multi CPU							

Compulsory C: Internet and its Applications	16. Networking (Physical)	LAN: Limited area/coverage: "Establish connection from X to Y"		WAN: Large, between cities			
		Tethering: Though USB/Bluetooth		Hotspot: Through Wi-Fi			
		Print Server: RJ45 to USB					
		P2P: Network of workstations, no sever → Low cost		Plug printer to Computer			
		Bluetooth					
		Client-Server: Connected to central server, high setup cost, high security					
		Tethering					
		NIC:		Network Interface Card: MAC address			
		Intranet: Closed group		Internet: Public			
		Switch/Hub: Establish connection between computers; Hub: Broadcast, low efficiency					
		Bridge:		Connect 2 LANs of same type			
		Router: Connect LAN to WAN, vice versa					
		Repeater:		Amplify signal, remove noise, overcome long distance			
		DHCP: Provide network information, IP					
		Modem:		Convert digital signals to analog signals, vice versa			
		RJ45/Twisted pair:		Twisted, eliminate EM interference			
		UTP/STP: Shielded; Cost					
	Coaxial:		BNC port, for TV, stronger shield than STP, long distance				
	Optical fiber:		Long distance, high speed ONLY, switch to switch, Digital, special device				
	Radio connection:		Satellite/Microwave/Wi-Fi: 802.11 a/b/g/n/ac: Can be extended to outdoors, high interference, intrusions, lower speed, limited coverage				
	Dial up:		56 Kbps, Telephone line, not RJ45				
	ISDN: Digital, whole cable						
	Broadband, lease line:		WAN, Digital, Router to connect LAN to WAN				
	Digital Modem						
	ADSL/SDSL:		Analog, Modem				
	SDSL: Use whole telephone cable						
	WAP/Wi-Fi Hot Spot:		Time/Speed limits				
	GPRS/EDGE/3G/4G:		Large range				
	17. Networking (OSI Model)	IPv4: 0-255, 4 bytes		IPv6: 0-FFFF, 16 bytes		Please do not throw sausage pizza away	
		Class	Class no.	Partitioning of IP address			
		A	0	1/7/24			
		B	10	2/14/16			
		C	110	3/21/8			
		Network/Host address: X all 1 all 0 Add 0.					
		URL: Refer to particular file		http	www		
				Protocol	Web site/Device		
		DNS: Translate domain name to IP		FQDN			
hkbuas		edu	hk				
		Generic code TLD	Country code TLD				
TCP/IP: Internet access, network connection							
TCP: Route, IP: Address; FTP: anonymous access							
18. Networking (Services)	Search engine: Spider, Catalogue, Access		Webmail > Client mail:		>Postal: [Cost, Speed, Att.]		
	Communication protocol: Set of rules about data, formatting of signalling that is understood by all communication devices		Advantage: No need specialized software Less setup time is needed to read email No need to download all attachments when viewing				
	HTTP/HTTPS; FTP/SFTP: Security		Disadvantage: Users must be online to read emails Have advertisements, not all of them are free				
	Telnet: Remote control; SSH: Secure		SMTP: Send and receive (webmail)				
	Plug in: small program integrated into a browser, provide additional functionality		IMAP: Receive, Mail saved on server, Sync, Folders				
	Metadata: author, encoding, at head, search engine		POP3: Receive, Download and (destroy)				
	CC: Public; BCC: Invisible; Email Signature ≠ Digital Signature		e-Commerce: B2C B2B C2C				
	Streaming: allow media file to start playing without completely downloading the entire file						
19. HTML	HTML HEAD TITLE BODY		<frameset cols="25%,*,25%"> <frame src="frame_a.htm"> </frmset>				
	H1: Largest H6: Smallest, Automatically  		<OL> <UL> <LI> <TABLE> <TR> <TD> rowspan				
	<body bgcolor="#E6E6FA" bgcolor="blue" background="bgimage.jpg"> <IMG src="abc.img">						
	<a href="mailto:abc@def.com?Subject=JKL" href="http://www.abc.com/def.html"> abc </a>						
	<PRE> <FONT size="13" face="Arial" color="blue"> <P align="left" "right" "center" "justify">						
20. Web Authoring	Web Structure: Linear, Hierarchical, Cyclic, Web		Free hosting: Storage size, Fix. domain name				
	Upload files to web server: Through FTP, Through integrated web authoring software						



Compulsory D: Basic Programming Concepts	21. Problem solving procedures	Problem identification		Problem analysis: IPO chart		Algorithm design:		
		Developing a solution: Structure diagram, Modules, Stepwise refinement, Top-down/bottom-up approach				Pseudocode: Easy to translate to codes		
		Debugging/testing:		Syntax:	Compiler/Debugger		Logic:	Debugger, dry run, trace table
		Run-time: ÷0, not enough memory: sqrt/log of 0, -ve Array out of range, overflow						
		Documentation:		User manual:		How to: install, start, use the program, handle errors		
				Program manual:		Technical details abt. algorithms, test data and output		
	22. Data Types	Flowchart:		Start/End: Round Rectangle		Write variable: Rectangle		IF: Diamond
				Input/Output: Parallelogram		Function/Predefined process: Large rectangle		
		String: No calculation needed				Character: Save storage space [Gender]		
		Integer/Double: Calculation needed				Boolean: Two values, save space/better data control		
		User friendliness:		Appropriate placement of elements on UI		Consistency in a user interface		
	23. Control Structures		Sequence control structure:		Run the program step by step, in order		Modular: Reuse, co-op	
			Selection control structure:		Decision logic struct: IF THEN ELSE		Case logic struct: SWITCH CASE	
			Iteration structure:		Pretest: FOR, WHILE		Posttest: DO-WHILE, REPEAT-UNTIL	
	24. Testing	Test data:		Cover whole range of allowable data		Test whether it can handle improper entries		
		Test all parts of program (all branches and modules)				Boundary cases		Loop: Dont test first
Comparing 2 programs: Memory/Variable usage, length, execution time, no. of iterations								
Easier for maintenance: Length/Complexity/ "No need to change code for different test cases"								
Calculator Syntax	If A=0: Then 2▲ Else 3▲ IfEnd: 4							
	While A>0: ?→A: If A=2: Then Break: IfEnd: A <sup>2</sup> WhileEnd: A							
	For 3→A To 5 Step 2: A <sup>2</sup> Next: A							
Compulsory E: Social Implications	25. Equity, Work and Heath issues	Internet:		Adv: Variety, Up to date		Dis: Unreliable, addictive		Telecommuting: Work from home
		Digital Divide: Economic, region, race, language, speed				Disabilities: Screen reader: Alt tag		
		"May suffer from CVS or RSI":		Take a short break every hour			Stretch/relax stressed muscles	
		Installing an anti-glare screen			Using a document holder to help read documents			
		Ergonomic devices: Wrist rest, foot rest, document holder, adjustable monitor						
	26. Copyright	Copyright ordinance		"Violate terms/license agreement"			Own rights to own/distribute?	
		Personal/commercial use? Used methods to avoid distribution → Personal						P2P file sharing
		Single user/Multi user (site) license: Limit to one location [School, company]						
		Commercial software/Shareware:			Comprehensive functions/customer support, trial version			
		Freeware/Open source software:			Distribute? Edit source code? Customer support?			
		Software license agreement and registration / CD Key [Digital key] / Machine Dependence						
	27. Malware	Hardware key (dongle) / Digital watermarking / Digital signature						
		Virus:	Duplicate via file		Worm:	Duplicate by itself, security loophole		Ransomware: Encrypt
		Spyware/Adware:		Pop up in browsers, supervise		Macro Virus:	Microsoft Office Document	
		Torjan Horse:		Disguise as useful app [game], secretly steal information				
		Anti-Virus software scan→ remove/quarantine infected files				Digital certificate and identity		
28. Privacy and Encryption	Firewall: Authenticate/avoid unauthorized access from internet, block virus attack/Port IO							
	Phishing: Fake website→ Check digital certificate, SSL (HTTPS)						HK Post: certificate authority	
	Spam: Waste time, mix up important emails, occupy storage space, slow down internet traffic							
	Counter spam: Install spam filter, block email addresses				Eavesdropping: Intercept	Intrusion		
	Proxy server: Anonymous location, translate all user requests, forwards to destination server							
PKI: Encrypt/Decrypt with public/private key → Secure data transmission, identity verification								
Exam skill: Answer type of information (1) and example/situation (1)								



Elective C: Multimedia Production and Web Site Development	1. Codec and Digitization	Digitization: Represent analog in discrete set of samples, multiple steps [become finer] Digital: More precise, save space, more convenient to process, store and duplicate, undamaged Codec: Used for (de)compression of multimedia files, more processing power   Comp ratio: >1			
	2. Text	Font: Set of printable or displayable characters with style and size specified			
		Style: Italic/Bold/Underline/Strikethrough		Typeface: Arial, Times New Roman	
		Font sizes: Points, 1/72 of an inch		Bitmap: Become ragged, <b>high compatibility</b>	
		Truetype: Mathematical format, generated by the program, Remain smooth when enlarged			
		Serif: Create visual effect so there is a line running under the text, increase readability Sans Serif: More modern look, used on web pages			
		Alignment: Left, Right, Center, Justified		Line spacing	Character spacing
		PDF: Cross platform, fonts and layout preserved on different platforms, cannot be edited easily			
		RTF: Text formatting features, graphics preserve, opened by most common word processors			
	TXT: Only ASCII characters		Scanner → OCR → Text processing		
	3. Graphics	Bitmap: Rectangular grid of pixels, each with a color value, Large amount of storage space			
		Vector: Stored in form of mathematical formula, lines, fills and arcs, Less storage space, Can individually edit component, Shape not only rectangular, Long loading time <b>if complex</b>			
		Resolution, Aspect ratio, color depth, magnify		Rasterization: V→B Image tracing: B→V	
		Editing: Brightness/Contrast, Resizing/Rotate, Sharpness/Blur, Graphics Filters (e.g. Invert)			
		8b: Indexed color/Grey scale	16: High color	24: True color (RGB)	32: Deep color (CMYK %)
		Uncompressed: BMP, RAW		Lossless: GIF (8) → Multiple pictures, PNG → Transparency	
	Lossy: JPEG, artifacts appear at sharp edges (TIFF)				
	4. Audio	Sampling rate, Sampling size, Channels, Length, Bit rate: Compression			Container format
		Uncompressed: WAV, MIDI: Digital instructions		Lossy: MP3, RM, WMA, AAC/M4A	
		Lossless: WMA, ALE		Editing: Adjusting volume, Fade in/out, trimming, tune pitch	
		Variable bit rate:	Same quality with lower file size, More time needed to encode/decode		
	5. Video	Frame, Frame size, Color depth (24), Frame rate, length, <b>streaming</b>			
		Uncompressed: AVI		Compressed: MP4, RM/RV, WMV, ASF, MOV, FLV	
		Audio compression: Separated from video compression		Editing: Subtitles, transitions, fade	
	6. Animation	Frame, Frame size, Color depth (GIF: 8, SWF: 24), Frame rate			GIF: Frame, SWF: Tween
		Script: no additional software		SWF: <b>plug in</b> , less storage, sound, magnify	GIF: Large file size
		Motion tween: Size, position, rotation, alpha		Actionscript: Buttons, interactive elements	
	9. Design factors	CPU, Bandwidth, Browser version/operating system/type, Plug-in, Language, Accessibility, Text only version, appropriate color combinations, <b>alt tag</b>			
10-11. Design Elements	Text field	Checkbox	Radio button	Pulldown[Jump/Click to expand] Menu and list Tables	
	<FORM name="survey" action=mailto:abc@def.com method="post">				
	Frames: Not printer friendly, hard to bookmark, more difficult to be indexed				
	Pop up windows: menu bar, scrollbars, resize handles, size, window name, alert user/blocked				
	Status bar: Not obstructed by other elements, Not in obvious position, → easily missed				
	Dialog window: color, size, location, title, opacity				
12. Server and Client	FTP connection: host name/address, user ID, password				
	Static/dynamic web page:				
	Client side scripting:	Low security, low response time [Validation], sufficient on client side			
	Server side scripting:	High security, high resp. time [Database] (submit), update, few download			
Cookie: Small text file stored on hard disk of users computer [user name, password, visit date] set expiration date, otherwise delete automatically when browser close					

Other: Sorting files: Via naming, folders

Transmit file online: Email, Split attachment into multiple files, cloud drive