Course #	Course Title	Course Specific Minimum Requirements
CMPT 105W D100	Soc. Issues & Cmns. Strategies	These courses are Technical English Writing courses and TAs will be expected to do the following: • Mark tests and written assignments for grammar, punctuation, sentences structure, etc • Assess essays for style, word choice, evidence and logic, audience expectation, as well as voice and tone • Assess paraphrasing, summarizing and quotations • Assist students to think critically, as well as apply rhetorical patterns to the appropriate situation • Understand the fundamental of informative and persuasive communication • Attend course meetings and respond to emails and messages in a timely manner • Attend lectures and tutorials (when requested by the instructor) • Communicate with the instructor with regards to student issues, etc. allowing the instructor to respond in a timely manner • Enter grades into Canvas (Speedgrader and Gradebook) • Hold office hours (when requested by the instructor) and communicate with students about their assignments and grades • Monitor online discussion forums • Meet assignment and exam marking deadlines. Student assignments are accumulative, meaning they require feedback in order to write/complete their next assignment. For example, students are required to write an outline, draft and a final for their essay assignment • Utilize time management skills as marking deadlines for the major assignments and exams can be close • Use assigned marking/grading rubrics and provide sufficient written feedback • Proctor tests and final exam (when requested by instructor) and report any suspected academic integrity issues to the course instructor • Familiar with the course materials and assignments and have experience with Canvas
CMPT 120 D100	Intro.Cmpt.Sci/ Programming I	

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CMPT 225 D100	Data Structures/ Programming	• Experience with programming in C++, including object oriented programming • Know all ADTs and data structures mentioned in the Course Outline, including AVL trees and B-Trees • Should have completed a course in analysis of algorithms (such as CMPT 705, 307, or equivalent) • Comfortable with the Linux command line
CMPT 276 D100	Intro Software Engineering	• Great programming skills • Practical and theoretical knowledge of different stages of software development, namely, requirements, design, construction, testing, refactoring, debugging, etc • Java, JUnit, Git, Maven • Good communication skills, proactive, and eager to assist students
CMPT 295 D100 & D200	Intro. to Computer Systems	• Should have completed introductory courses to Computer Systems and Operating Systems (such as CMPT 295, 300, or equivalent) • Previous experience with RISC-V, MIPS or any CISC (x86-64)

CMPT 318 D100	Special Topics Cmpt. Science	• Cyber intelligence and threat analysis • Situational awareness, anomaly detection, scoring methods • Discrete Markov process modelling • Time series analysis and forecasting with Hidden Markov models • Familiarity with statistical inference and machine learning • R language and software environment for statistical computing • Programming in Python with applications in stochastic modelling • Cybersecurity risk assessment and management • Foundations of blockchain technology
CMPT 340 BLS1	Biomedical Computing	• Analog and digital signals (digitization, sampling, quantization) • Linear systems (impulse response, convolution, Fourier transform, time/space-frequency, duality) • Time- and frequency-domain signal filtering • Multi-variate statistics (histogram, correlation, covariance matrix, PCA) • Vector/matrix algebra (vectors, matrices, eigen-decomposition) • 1D, 2D, 3D, point clouds, and graphs/networks • Terminology of biosignals/bioimages (ECG, MRI, microscopy) • Probabilities (probability distributions, Bayes' theorem • Classification (thresholding, ROC, AUC, ANN/CNN, Fisher LDA,) • MATLAB
CMPT 353 D100	Computational Data Science	• Working knowledge of Python data manipulation tools: NumPy, Pandas • Basic concepts of inferential statistics and machine learning • Strong experience with Spark; experience analyzing with scientific data sets
CMPT 354 D100	Database Systems I	• Knowledge of the relational model and the entity/relationship (E/R) model • Knowledge of relational algebra and calculus • Working knowledge and good programming skills with SQL • Experience with MS SQL Server is an asset • Knowledge of relational design theory, in particular normalization • Knowledge of other topics in the course outline, such as transactions, constraints and triggers, indexes, database applications development
CMPT 361 D100	Intro to Visual Computing	• Background in image processing and computer vision • Experience in MATLAB OR • Experience with OpenGL and WebGL programming • Completed Computer Graphics courses before

CMPT 363 D100	User Interface Dsgn	• Preference will be given to students who have demonstrated good standing in User Interface Design, Graphics, HCI, Visualization, Vision, and Multimedia (such as CMPT 363, 888, 985, o requivalent course at the undergraduate or graduate HCI level) • Hands-on experience in applying principles of human-computer interaction, user-centered design, usability engineering, and/or interaction design • Must have a research and/industry portfolio that demonstrates user interface designs and/ or results from user studies • Must have familiarity with modern UI prototyping tools, such as Balsamiq and Figma
CMPT 365 D100	Multimedia Systems	• Good understanding of multimedia systems design, especially knowledge of some multimedia library in both C++ and in Java (examples include open file dialog, create canvas, plot pixels/lines, read and display audio/image files) • Working knowledge of multimedia hardware and software • Good understanding of representing, compressing, processing and transmitting multimedia data such as soud, image and video (examples include FLAC, JPEG, MPEG, H.264/265)

CMPT 376W D100	Prof. Resp. & Tech. Writing	This course is a Technical English Writing course covering ethics, writing and oral communication across computing research, startup and industrial software development contexts. TAs will be expected to do the following: • Mark tests and written assignments for grammar, punctuation, sentence structure, etc • Mark oral presentations and videos • Assess papers for style, word choice, evidence and logic, audience expectation, as well as voice and tone • Assess paraphrasing, summarizing and quotations • Assist students to think critically, as well as apply rhetorical patterns to the appropriate situation • Understand the fundamental of informative and persuasive communication • Attend course meetings and respond to emails and messages in a timely manner • Attend lectures and tutorials (when requested by the instructor) • Communicate with the instructor with regards to student issues, etc. allowing the instructor to respond in a timely manner • Enter grades into Canvas and/or TurnItIn (Speedgrader and Gradebook) • Hold office hours (when requested by the instructor) and communicate with students about their assignments and grades • Monitor online discussion forums • Meet assignment marking deadlines • Utilize time management skills as marking deadlines for the major assignments and exams are close • Use assigned marking/grading rubrics and provide sufficient written feedback • Proctor tests and final exam (when requested by instructor) and Report any suspected academic integrity issues to the course instructor *********KEEP READING******** REQUIREMENTS: • Excellent command of spoken and written English • Experience in writing and critiquing research papers RECOMMENDED: • Experience in industry or a degree in the humanities or business • Familiarity with the course materials and Canvas
CMPT 383 D100	Programming Langs.	• Good understanding of a variety of programming languages • Experience with Haskell and functional programming • Some familiarity with operational semantics • Some familiarity with type theory • Some familiarity with lambda calculus • Good programming skills • Good communication skills; happy to assist students
CMPT 384 D100	Symbolic Computing	• Experience with functional programming in languages such as Haskell, ML or Lisp

CMPT 400 D100	3D Computer Vision	• Proficiency and thorough knowledge of 3D visualization (opengl, directx) • Proficiency and thorough knowledge of non-linear numerical optimization (quasi newton methods) • Proficiency and thorough knowledge of 3D representations (polygonal meshes and implicit representations) • Proficiency and thorough knowledge of artificial intelligence (pytorch and differentiable optimization) • Proficiency nd thorough knowledge of differential geometry
CMPT 404 D100	Cryptography and Protocols	• Solid background in discrete mathematics • Knowledge of algorithms and complexity • Background in cryptography, have to complete a cryptography course • Knowledge of probability • Some experience in programming, especially for remote access
CMPT 405 D100	Cmpt. Algorithms	• Solid background in algorithm design and analysis • Good knowledge of classical algorithms and standard algorithmic paradigms such as greedy, divided and conquer, dynamic programming, network flow, linear programming • Good knowledge of NP-completeness, polynomial-time reductions, approximation and randomized algorithms • Should have completed a Design and Analysis of Computing Algorithms course (such as CMPT 405, 705 or equivalent)
CMPT 409 D100	Spec.Topics/ Theoretical Cmpt	• Knowledge of computability and logic • Should have completed a computability and logic course (such as CMPT 701 or equivalent) • Strong background in mathematical logic
CMPT 410 D100	Machine Learning	• Strong background in linear algebra and probability • Familiarity with NumPy and PyTorch • Should have completed a machine learning course (such as 726 or equivalent) • Stable internet connection for remote instruction of tutorials
CMPT 413 D100	Computational Linguistics	• Strong background in machine learning and deep learning • Knowledgeable about NLP concepts and models (word embeddings, language models, seq2seq models, parsing). Preferably have completed a NLP course (such as CMPT 413/713 or equivalent) • Proficiency with Python and Pytorch programming. Experience with Huggingface transformers library is a plus • Experience with modern NLP datasets like GLUE, WMT, SQUaD, CoNLL • Experience with large language models like BERT, GPT, Llama • Good communication skills, proactive, and eager to assist students
CMPT 419 BLS1	Spec.Topics/ Artificial Intell.	• Experience with machine learning, especially with dynamic and/or multimodal signal processing (eg. video, sound, sensors) • Experience in image processing (Fourier transform, convolution, intensity and spatial transformations), computer vision (segmentation, registration), and MATLAB
CMPT 419 D100	Spec.Topics/ Artificial Intell.	• Experience with machine learning, especially with dynamic and/or multimodal signal processing (eg. video, sound, sensors).

CMPT 419 D200	Spec.Topics/ Artificial Intell.	• Should have completed an AI, machine learning, or data science course (such as CMPT 353, 412, 419, or equivalent) • Should have completed an HCI course (such as CMPT 263 or equivalent) or a fair/responsible AI course
CMPT 419 D300	Spec.Topics/ Artificial Intell.	• Should have completed a machine learning course (such as CMPT 410/726 or equivalent) • Should have completed advanced deep learning-related courses (such as CMPT 361, 413, 420 or equivalent) • Hands-on experience with deep learning and good familiarity with PyTorch programming • Experience in reading, writing, and reviewing research papers
CMPT 420 D100	Deep Learning	• Should have completed a graduate machine learning course (such as CMPT 726 or equivalent) • Needs to know a programming framework for deep learning (e.g. Pytorch, Keras, tensorflow) • Experience with using deep learning in a project, could be course project or even better their own research
CMPT 431 D100	Distributed Systems	• Should have completed a course in operating systems (such as CMPT 300) and distributed systems and/or parallel computing (such as CMPT 431) or equivalents • Must be proficient with at least two of the following: C++11 threads, POSIX threads, CilkPlus, OpenMP, MPI • Must be proficient with modern C++ programming (threads, processes, atomics, ...) and Linux problem solving (command line, packages, configuration, ...) • Experience with scalable parallel software development is highly desirable • Experience with Distributed Computing Systems (such as CMPT 479 Prof. Vora's offering or equivalent) is highly desirable
CMPT 454 D100	Database Systems II	• Must have working knowledge of the contents covered by CMPT 300/201, CMPT 354, and CMPT 454 (or equivalent of the three courses) • Deep understanding and working knowledge of core relational database systems topics, including transaction processing, storage systems, query execution and optimization, volatile and persistent index structures • Must have extensive experience and be proficient with parallel programming in C++11 or newer C++ standards • Must be proficient in using debugging (GDB, Valgrand), performance evaluation (perf, gperftools) and modern build systems (CMake) • Previous hands-on C++ experience in implementing core database engine components: index structures, locking protocols, durability/recovery mechanisms, storage functionality
CMPT 459 D100	Special Topics Database Systs	• Must have working knowledge on core database systems topics, including the internals of database engines, query executors, query optimizers, and concurrent index structures (e.g., B+-trees, hash tables) • Must have experience in core database systems research (e.g., transaction processing, query optimization, query compilation, database storage systems, cloud-native database systems) • Preferably with experience of publishing papers in SIGMOD/VLDB/ICDE/CIDR on database engine topics • Should have completed an Operating Systems course (such as CMPT 300 or equivalent) and a Database Systems course (such as CMPT 454 or equivalent) • Must be familiar with modern C++ programming, debugging, and performance analysis using tools like GCC, GDB, Clang, perf

CMPT 705 G100	Design/Analysis Algorithms	• Solid background in algorithm design and analysis • Good knowledge of classical algorithms and standard algorithmic paradigms such as greedy, divided and conquer, dynamic programming, network flow, linear programming • Good knowledge of NP-completeness, polynomial-time reductions, approximation and randomized algorithms • Should have completed a Design and Analysis of Computing Algorithms course (such as CMPT 405, 705 or equivalent)
CMPT 713 G100	NLP	• Strong background in machine learning and deep learning • Knowledgeable about NLP concepts and models (word embeddings, language models, seq2seq models, parsing). Preferably have completed a NLP course (such as CMPT 413/713 or equivalent) • Proficiency with Python and Pytorch programming. Experience with Huggingface transformers library is a plus • Experience with modern NLP datasets like GLUE, WMT, SQUaD, CoNLL • Experience with large language models like BERT, GPT, Llama • Good communication skills, proactive, and eager to assist students
CMPT 722 G100	Rendering & VC for AI	• Should have completed a visual computing course (such as CMPT 469/722 or equivalent) • Strong background in computer graphics, 3D computer vision, and machine learning
CMPT 724 G100	Affective Computing	• experience with machine learning, especially with dynamic and/or multimodal signal processing (eg. video, sound, sensors).
CMPT 726 G100	Machine Learning	• Strong background in linear algebra and probability • Familiarity with NumPy and PyTorch • Should have completed a machine learning course (such as 726 or equivalent) • Stable internet connection for remote instruction of tutorials
CMPT 728 G100	Deep Learning	• Should have completed a graduate machine learning course (such as CMPT 726 or equivalent) • Needs to know a programming framework for deep learning (e.g. Pytorch, Keras, tensorflow) • Experience with using deep learning in a project, could be course project or even better their own research
CMPT 733 G100	Big Data Lab II	• Knowledge in OS memory safety and execution semantics • Programming languages: C/C++ and Python. Assembly/Shellcode is a plus • Working knowledge and experience with Linux and shell programming • Should have completed an Operating Systems course (such as CMPT 300 or equivalent) a Cryptography and Cryptographic Protocols course (such as CMPT 404 or equivalent) and a Networking course (such as CMPT 471 or equivalent) • Familiarity with networking tools and frameworks • Familiarity with running/participating in CTFs is a bonus • A working knowledge in security field is a bonus

CMPT 741 G100	Data Mining	• Must have good knowledge of data mining tasks and algorithms • Must have finished one data mining research project in depth (e.g., publishing a top-tier data mining conference paper), or be a member in the data mining group at SFU • Must be proficient in Python and in libraries such as scikit-learn and pandas • Proficiency in Java/R is an asset • Data mining project experience is highly desirable
CMPT 743 G100	Visual Computing Lab II	• Proficiency in Python and PyTorch • Familiarity with Convolutional Neural Networks including Unet, VGG • Deep Dream and Perceptual Features • Familiarity with Generative Adversarial Networks including Pix2pix and CycleGan • Familiarity with Deep Geometry Processing including PointNet and PointNet++
CMPT 756 G100	Distributed and Cloud Systems	

CMPT 786 G100	Cloud and Network Security	• Working knowledge of networks, distributed systems, and cloud basics • Experienced with networking and TCP/IP Protocol Stack, including TCP, QUIC, BGP, TLS, DNS, DNSSEC • Experienced with at least one public cloud environment, preferably GC and/or AWS • Working Knowledge of Network Operational Security, including firewalls, intrusion detection, segmentation, etc.
CMPT 788 G100	Information Privacy	Ability to assist with this course covering the following topic: • Technological innovation in how individuals, organizations, and governments collect and share personal information have raised serious concerns • Data breaches have grown in frequency over the past decade, exposing us to identity theft, financial fraud and intellectual property theft • Fundamental privacy concepts in a broad sense with emphasis on challenging and emerging research topics in privacy
CMPT 800 G100	3D Computer Vision	• Proficiency and thorough knowledge of 3D visualization (opengl, directx) • Proficiency and thorough knowledge of non-linear numerical optimization (quasi newton methods) • Proficiency and thorough knowledge of 3D representations (polygonal meshes and implicit representations) • Proficiency and thorough knowledge of artificial intelligence (pytorch and differentiable optimization) • Proficiency nd thorough knowledge of differential geometry
CMPT 820 G100	Multimedia Systems	• Experience with multimedia data representations, compression, and content distribution and interaction • Familiar with Entropy Coding(Huffman/LZW/Arithmetic Coding) and DCT implementation • Familiar with C++/Java/Python programming, including external libraries for GUI and BMP/JPEG
CMPT 839 G100	Advanced NLP	• Strong background in machine learning and deep learning • Knowledgeable about NLP concepts and models (word embeddings, language models, seq2seq models, parsing). Preferably have completed a NLP course (such as CMPT 413/713 or equivalent) • Proficiency with Python and Pytorch programming. Experience with Huggingface transformers library is a plus • Experience with modern NLP datasets like GLUE, WMT, SQUaD, CoNLL • Experience with large language models like BERT, GPT, Llama • Good communication skills, proactive, and eager to assist students
CMPT 889 G100	Spec.Topics /	Interdisc Cdound in mach, includingeEdP5ative, and eagty theft, financ18P1D(.ivA3rning and deep softwave tion TD(• ar with Entropy Coding(Huff and likeuch

CMPT 982 G100	Spec. Top. in Network-Systems	• Cyber situational awareness and threat intelligence models • Multivariate time series anomaly detection and forecasting • Discrete Markov models of stochastic processes • Bayesian inference and statistical machine learning • Cyber security risk assessment and management • R language and software environment for statistical computing • Critical infrastructure security and supervisory control systems • Foundations of blockchain technology and applications • Excellent English language communication skills
CMPT 982 G200 & G300	Spec. Top. in Network-Systems	• Preferably a graduate student in software and systems • Familiarity with research on analysis, comprehension, debugging, and testing in software engineering • Familiarity with research on mobile (Android or iOS) • Great analytical skills, ability to read academic papers, review, and discuss them • Good programming skills (related to mobile— Java, Swift, C++, Android OS, iOS, etc.), ability to understand and grade code, and help students with their projects • Good communication skills, proactive, and eager to assist students
CMPT 983 G100	Spec. Top. in Art Intelligence	• Should have completed an Introduction to Computer Graphics course (such as CMPT 361 or equivalent) • Background in computer graphics, 3D computer vision, and machine learning • Experience reading, writing, and reviewing research papers • Established experience (e.g. >1yr) in neural rendering (NeRF and 3DGS)
CMPT 983 G200	Spec. Top. in Art Intelligence	• Background in multi-robot systems, automated planning, and heuristic search • Should have completed an Introduction to AI course • Experience reading, writing, and reviewing research papers
CMPT 983 G300	Spec. Top. in Art Intelligence	• Should have completed a machine learning course (such as CMPT 410/726 or equivalent) • Should have completed advanced deep learning-related courses (such as CMPT 361, 413, 420 or equivalent) • Hands-on experience with deep learning and good familiarity with PyTorch programming • Experience in reading, writing, and reviewing research papers
CMPT 984 G100	Spec.Top. Base-Mining-CMPT Bio	• Must have working knowledge on core database systems topics, including the internals of database engines, query executors, query optimizers, and concurrent index structures (e.g., B+-trees, hash tables) • Must have experience in core database systems research (e.g., transaction processing, query optimization, query compilation, database storage systems, cloud-native database systems) • Preferably with experience of publishing papers in SIGMOD/VLDB/ICDE/CIDR on database engine topics • Should have completed an Operating Systems course (such as CMPT 300 or equivalent) and a Database Systems course (such as CMPT 454 or equivalent) • Must be familiar with modern C++ programming, debugging, and performance analysis using tools like GCC, GDB, Clang, perf

MACM 101 D100 & D200	Discrete Math I	• Solid background in Discrete Mathematics including counting (combinatorics), propositional and predicate logic, deductive logic, set theory and basics of computational complexity, number theory, functions, relations, and different proof principles • Solid teaching and interpersonal skills as needed in the tutorials, excellent communication skills in English, excellent rapport with students • Responsible, showing initiative, responsive, and punctual • Excellent time management, meeting deadlines • Must be enthusiastic about assisting a group of students with diverse academic backgrounds • Must be familiar with zoom, Blackboard Ultra Collaborate, SFU Canvas and Skype • Previous experience being a TA for MACM 101 preferred

Course #	**Course Title**	**Course Specific Minimum Requirements**
CMPT 105W D200	Soc. Issues & Cmns. Strategies	These courses are Technical English Writing courses and TAs will be expected to do the following: • Mark tests and written assignments for grammar, punctuation, sentences structure, etc • Assess essays for style, word choice, evidence and logic, audience expectation, as well as voice and tone • Assess paraphrasing, summarizing and quotations • Assist students to think critically, as well as apply rhetorical patterns to the appropriate situation

CMPT 135 D100	Intro to Computer Prog II	• Familiar with C++ programming, including pointers, classes, and objects
CMPT 201 D200	Systems Programming	• Strong knowledge in C • Extensive experience in low-level systems programming on Linux (file system interface, threads, processes, sockets, memory allocation, etc.) • Extensive experience in scripting on Linux (shell, python, etc.) • Extensive experience in build systems such as make and cmake • Extensive experience in debugging with debuggers such as GDB • Experience in Linux system administration
CMPT 213 D100	Object Oriented Design in Java	• Strong experience with Java • Confident with design patterns (such as MVC and observer) • Experienced with OOD • Experience with Java Spring Boot is an advantage
CMPT 225 D200	Data Structures/ Programming	• Experience with programming in C++, including object oriented programming • Know all ADTs and data structures mentioned in the Course Outline, including AVL trees and B-Trees • Should have completed a course in analysis of algorithms (such as CMPT 705, 307, or equivalent) • Comfortable with the Linux command line
CMPT 276 D200	Intro Software Engineering	• Great programming skills • Practical and theoretical knowledge of different stages of software development, namely, requirements, design, construction, testing, refactoring, debugging, etc • Java, JUnit, Git, Maven • Good communication skills, proactive, and eager to assist students
CMPT 307 D200	Data Structures	• Experience with introduction and mathematical preliminaries, asymptotic notation, models of computation and basic probability theory and mathematical maturity • Experience with priority queues: Heaps • Experience with randomized algorithms, dynamic programming, etc. good familiarity with data structures, graphs, and graph algorithms (shortest paths, connected components, minimum spanning trees) solid background in algorithm design and analysis • Knowledge of classical algorithms and standard algorithmic paradigms such as greedy heuristics, dynamic programming and linear programming
CMPT 371 D100	Data Communications/ Networking	• Be familiar with network layers and protocols, in particular, TCP/IP protocol stack • Have experience with socket programming, Python • Have good communication skills and the ability to clearly explain networking concepts and the functioning of networks and protocols to students in response to student questions • Promptly communicate with the instructor with regards to issues with student work including common misunderstandings of course material and subspected academic dishonesty • Meet assignment marking deadlines. Student assignments and quizzes are scaffolded, feedback from one activity is often needed to understand later activities or be ready for assessment activities. • Use assigned marking/grading rubrics and provide sufficient written feedback • Hold office hours and monitor online discussion forums as assigned by the instructor

CMPT 376W D200	Prof. Resp. & Tech. Writing	This course is a Technical English Writing course covering ethics, writing and oral communication across computing research, startup and industrial software development contexts. TAs will be expected to do the following: • Mark tests and written assignments for grammar, punctuation, sentence structure, etc • Mark oral presentations and videos • Assess papers for style, word choice, evidence and logic, audience expectation, as well as voice and tone • Assess paraphrasing, summarizing and quotations • Assist students to think critically, as well as apply rhetorical patterns to the appropriate situation • Understand the fundamental of informative and persuasive communication • Attend course meetings and respond to emails and messages in a timely manner • Attend lectures and tutorials (when requested by the instructor) • Communicate with the instructor with regards to student issues, etc. allowing the instructor to respond in a timely manner • Enter grades into Canvas and/or TurnItIn (Speedgrader and Gradebook) • Hold office hours (when requested by the instructor) and communicate with students about their assignments and grades • Monitor online discussion forums • Meet assignment marking deadlines • Utilize time management skills as marking deadlines for the major assignments and exams are close • Use assigned marking/grading rubrics and provide sufficient written feedback • M:

MACM 101 D300	Discrete Math I	• Solid background in Discrete Mathematics including counting (combinatorics), propositional and predicate logic, deductive logic, set theory and basics of computational complexity, number theory, functions, relations, and different proof principles • Solid teaching and interpersonal skills as needed in the tutorials, excellent communication skills in English, excellent rapport with students • Responsible, showing initiative, responsive, and punctual • Excellent time management, meeting deadlines • Must be enthusiastic about assisting a group of students with diverse academic backgrounds • Must be familiar with zoom, Blackboard Ultra Collaborate, SFU Canvas and Skype • Previous experience being a TA for MACM 101 preferred