### **Class - 1: Introduction to Computer Programming and Competitive Programming and My Life story**

* Introduction to the course
* Introduction to Computer Programming
* Introduction to Competitive Programming
* Introduction to Programming Contest
* My Life story and motivation for doing competitive programming

### **Class - 2: Introduction to online judges and Guideline for practice**

* Introduction to Online Judges
* Guideline for Practice

### **Class - 3: Introduction to Codeforces Programming Contest (Div-4, Div-3, Div-2, Edu, Div-1)**

* Introduction to Codeforces Contest
* Div-4, Div-3, Div-2, Edu, Div-1
* ICPC Style Ranklist, Codeforces Score RankList
* What is codeforces rating? and how codeforces contests affect the rating.

### **Class - 4: Introduction to Different Famous Online and Onsite Contests**

* Introduction to Onsite contest ( Divisional, National )
* ICPC, NCPC, IUPC
* Introduction to Online Contests
* Google Codejam, Google Kick Start, Facebook hacker cup, Snack Down
* Some Important links

### **Class - 5: Write your first "Hello World" Program and solve your first Online Judge Problem**

* Write Your First Program “Hello World”
* Solve Problem from BeeCrowd
* Solve the Easiest Problem of ACM ICPC Dhaka Regional Onsite Contest -2020
* Variables and Data type ( int, long long, char )

Practice Problems ( Assignment) :

* <https://www.beecrowd.com.br/judge/en/problems/view/1000>
* <https://algo.codemarshal.org/contests/diu_takeoff_fall_19/problems/A>
* <https://algo.codemarshal.org/contests/icpc-dhaka-20/problems/K>
* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/welcome-to-cps-academy>

### **Class - 6: Double, Float, bool, Taking Input (scanf), Operators (+, -, \* )**

* float and double data types
* Taking input (int, long long, double, float, char)
* Operators ( +, -, \* )

Practice Problems ( Assignment) :

* <https://acm.timus.ru/problem.aspx?space=1&num=1000>
* <https://www.beecrowd.com.br/judge/en/problems/view/1004>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_1_B>
* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-6-a-task-1-a-addition-subtraction-and-multiplication>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_1_C>
* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-7-a-task-1-a-solve-the-equation-i>
* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-7-a-task-2-a-solve-the-equation-ii>

### **Class - 7: Fraction Operations and Modulus**

* Fraction Calculation
* Modulus operation
* Cyclic Pattern in Modulus

Practice Problems ( Assignment) :

* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-6-a-task-1-a-addition-subtraction-and-multiplication>\
* <https://www.beecrowd.com.br/judge/en/problems/view/1006>
* <https://atcoder.jp/contests/abc235/tasks/abc235_a?lang=en>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_4_B>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_4_A>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_1_D>

### **Class - 8 : +=, -=, \*=, /=, %=, increment(++), decreament(--) and bitwise operators OR(|), AND(&), XOR(^)**

* More operators (+=, -=, \*=, /=, %= )
* Increment, decrement
* Pre increment / decreament
* Post increment / decreament
* Bitwise operators OR(|), AND(&), XOR(^)
* Patterns in XOR
* An interesting google interview question with XOR

Practice Problems ( Assignment) :

* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-8-aa-task-1-aa-calculate-the-or>
* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-8-aa-task-1-aa-calculate-the-and>
* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-8-aa-task-1-aa-calculate-the-xor>

### **Class - 9: if-else Condition**

* Condition and comparison
* Get Grades using marks
* Get match joining validity using weight

Practice Problems (Assignment):

* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-10-aa-task-1-aa-rock-paper-scissors>
* <https://atcoder.jp/contests/abc148/tasks/abc148_a?lang=en>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_2_C>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_2_B>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_2_A>

### **Class - 10: if-else Condition, How to think of the scenario not the test case**

* Think scenario, not a test case

Practice Problems ( Assignment) :

* <https://codeforces.com/problemset/problem/4/A>
* <https://atcoder.jp/contests/abc149/tasks/abc149_b>

### **Class - 11: Loops**

* Loops
* While loop
* For loop
* Do-while loop
* Infinite loop
* Relationship of variables between parent block and child block

Practice Problems ( Assignment) :

* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_3_A>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_3_B>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_3_C>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_3_D>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_4_C>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_4_D>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_5_A>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_5_B>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_5_C>

### **Class - 12: Practice problems on Loops**

* How to handle text cases
* Calculate int square root of n
* Calculate the number of divisors of a number n
* Fast discussed some loop problems from vjudge assignment contest

Practice Problems ( Assignment) :

* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-13-aa-task-1-aa-is-perfect-square-i>
* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-13-aa-task-2-aa-count-number-of-divisors-i>
* <https://lightoj.com/problem/greetings-from-lightoj>
* <https://lightoj.com/problem/opposite-task>

### **Class - 13: Practice problems on Loops**

* More practice problems on loops

Practice Problems ( Assignment) :

* <https://leetcode.com/problems/three-divisors/>
* <https://codeforces.com/contest/1560/problem/A>
* <https://atcoder.jp/contests/abc151/tasks/abc151_b>

### **Class - 14: Introduction to Arrays**

* Introduction to Arrays
* Count the frequency of elements in an array

Practice Problems ( Assignment) :

* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-16-aa-task-1-aa-count-the-frequency-i>
* <https://atcoder.jp/contests/abc235/tasks/abc235_b>

### **Class - 15: Practice problems of Arrays**

* Practice problems on arrays

Practice Problems ( Assignment) :

* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-16-aa-task-1-aa-count-the-frequency-i>
* <https://atcoder.jp/contests/abc236/tasks/abc236_b>
* <https://www.hackerrank.com/contests/cpbc-assignments-batch-1/challenges/class-17-aa-task-1-aa-respectfully-giving-away>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_6_A>
* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_6_B>
* <https://cses.fi/problemset/task/1083>

### **Class - 16: Introduction multi-dimension array and char array (String)**

* Introduction to strings
* reverse string
* check string is palindrome or not
* Multi dimension array
* 2D, 3D array
* Grid (input and output)

Practice Problems ( Assignment) :

* <https://atcoder.jp/contests/abc233/tasks/abc233_b>
* <https://codeforces.com/problemset/problem/469/A>

### **Class - 17: Practice Problems for 2D Array and string**

* Convert char to digit
* Convert digit to char
* Indexing of char

Practice Problems ( Assignment) :

* <https://judge.u-aizu.ac.jp/onlinejudge/description.jsp?id=ITP1_6_D>

### **Class - 18: Introduction to Bruteforce**

* Brute force

Practice Problems ( Assignment) :

* <https://codeforces.com/problemset/problem/304/A>

### **Class - 19: Introduction to Constructive and Practice problem of Bruteforce**

* Practice Problems of Brute force
* Introduction to Constructive Algorithm

Practice Problems ( Assignment) :

* <https://codeforces.com/problemset/problem/199/A>
* <https://cses.fi/problemset/task/1070>
* <https://atcoder.jp/contests/abc234/tasks/abc234_b>

### **Class - 20: Introduction to Greedy**

* Introduction to Greedy
* Solving the knapsack problem with Greedy
* Using the 0-1knapsack Problem proved that we can’t solve it using Greedy

Practice Problems ( Assignment) :

* <https://codeforces.com/contest/514/problem/A>

### **Class - 21: Practice Problem to Greedy**

* Practice problems on greedy

Practice Problems ( Assignment) :

* <https://codeforces.com/contest/1207/problem/A>
* <https://cses.fi/problemset/task/1094>

### **Class - 22: Time and Memory complexity analysis**

* Time complexity
* Big-O notation
* O(1) Constant time complexity
* O(n) Linear time complexity
* O(n^2)
* O(n^3)
* O(log(n))
* Polynomial time complexity
* Exponential time complexity

### **Class - 23: Introduction to Function**

* Introduction to Function
* Implement some important functions
* swap, min, max
* call by value
* call by reference

### **Class - 24: Starting Program to C++**

* Implement pow() function
* Implement reverse function
* Introduction to C++
* I/O (cin, cout)
* #define
* typedef
* making cin cout faster
* set precision
* built-in functions (swap(), max(), min(), sqrt(), cbrt(), ceil(), floor()

### **Class - 25: Builtin functions of C/C++**

* Reverse
* Sort function
* Increasing order / non-decreasing order
* Decreasing order / non-increasing order
* isupper(), islower(), toupper(), tolower()
* strcat(), strcmp(), strcpy(), strlen()
* \_\_gcd(), lcm()