1. এখন পর্যন্ত ভিডিওগুলাতে যতগুলা কোড দেখানো হয়েছে সবগুলো কোডব্লকস এ টাইপ করে রান করে দেখ। প্রতিক্ষেত্রে মিলিয়ে দেখ আউটপুট মিলে কিনা।

Consider the Date and Student structures that we defined.

struct Date {

int day;

int month;

int year;

};

struct Student{

char\* name[100];

int class;

int roll;

struct Date dob;

};

1. Create a student named “Peter Parker” who studies in class 4 with roll number 23 and was born on 16 October, 1982.

1. Write a function called isValid that determines if a date is a valid date. Do not forget to handle leap years. Your signature should be

bool isValidDate(struct Date date);

Example:  
isValidDate( (struct Date) {1, 12, 2000} ) should return true.

isValidDate( (struct Date) {12, 15, 2000} ) should return false.

isValidDate( (struct Date) {29, 2, 2001} ) should return false.

isValidDate( (struct Date) {29, 2, 2004} ) should return true.

1. Write a function isBirthday that takes a student and a date and determines if his birthday is on that date. Your signature should be

bool isBirthday(struct Date date, struct Student student);

1. Define a structure called point that defines a point on the 2d plane. It should have 2 members, its x and y coordinates.

1. Define a function that takes two points, and finds their midpoint. Use the point structure defined above to take both input and output.

1. Complete the implementation of the toBinary function. Remember that it had the signature

void toBinary(unsigned int val, char str[], int k)

The function stores the binary representation of val in str as a k bit binary number.

1. Suppose x and y are two variables. Experiment to find out the values of the following expressions. Justify your answer in each case
   1. x & 0
   2. x & x
   3. x ^ x
   4. x ^ y ^ x
   5. (x & y) | y
   6. ~~x
2. Write a program to find out the xor of the first n positive integer. For example, when n = 4, the answer should be (**1^2**^3^4) = (**3 ^ 3** ^ 4) = (**0 ^ 4**) = 4

Use your program to fill up the following table-

| n | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Xor of first n  Positive integers |  |  |  |  |  |  |  |  |  |  |  |

Can you see any pattern?

1. Use the right shift operator to find the minimum number of bits to represent an integer. For example 10 has binary representation “1010”. So, it takes 4 bits.

Hint: Keep shifting right until you get 0.