

Experiment 4: Loops

4.5. Ramanujan Number is the smallest number that can be expressed as the sum of two cubes in two different ways. WAP to print all such numbers up to a reasonable limit.

Example of Ramanujan number: 1729

$12^3 + 1^3$ and $10^3 + 9^3$. for a number $L=20$ (that is limit)

Ans-:

```
#include <stdio.h>

int main() {
    printf("Name - Aryan kamboj\nSAP ID - 590025526\ncourse - BCA\nBatch - 6");
    printf("\n-----\n");

    int L;
    int found = 0;

    printf("Enter the limit L: ");
    scanf("%d", &L);

    printf("Ramanujan Numbers up to %d:\n", L);

    for (int a = 1; a * a * a <= L; a++) {
        for (int b = a; a * a * a + b * b * b <= L; b++) {

            int sum1 = a*a*a + b*b*b;

            for (int c = a + 1; c * c * c <= sum1; c++) {
                for (int d = c; c * c * c + d * d * d <= sum1; d++) {

                    int sum2 = c*c*c + d*d*d;

                    if (sum1 == sum2 && sum1 <= L) {
                        printf("%d = %d^3 + %d^3 = %d^3 + %d^3\n",
                            sum1, a, b, c, d);
                        found = 1;
                    }
                }
            }
        }
    }
}
```

```

    if (!found) {
        printf("No Ramanujan numbers found up to %d.\n", L);
    }

    return 0;
}

```

Output :

```

● aryankamboj@users-MacBook-Air lab_7 % cd "/Users/aryankamboj/Desktop/c_programming_theory/lab_7/" && gcc
  4.5.c -o 4.5 && "/Users/aryankamboj/Desktop/c_programming_theory/lab_7/"4.5
Name - Aryan kamboj
SAP ID - 590025526
course - BCA
Batch - 6
-----
Enter the limit L: 20
Ramanujan Numbers up to 20:
No Ramanujan numbers found up to 20.
● aryankamboj@users-MacBook-Air lab_7 % cd "/Users/aryankamboj/Desktop/c_programming_theory/lab_7/" && gcc
  4.5.c -o 4.5 && "/Users/aryankamboj/Desktop/c_programming_theory/lab_7/"4.5
Name - Aryan kamboj
SAP ID - 590025526
course - BCA
Batch - 6
-----
Enter the limit L: 2000
Ramanujan Numbers up to 2000:
1729 = 1^3 + 12^3 = 9^3 + 10^3

```