Name: Dixit Sanket Ashwani
Roll no.: 20 Div: A
Batch: A1

Program:

```c
#include <stdio.h>

#include <string.h>

int main() {

    char txt[] =

"tutorialsPointisthebestplatformforprogrammers";

    char pat[] = "a";

    int M = strlen(pat);

    int N = strlen(txt);

    for (int i = 0; i <= N - M; i++) {

        int j;

        for (j = 0; j < M; j++) {

            if (txt[i + j] != pat[j]) {

                break;

            }

        }

        if (j == M) {

            printf("Pattern matches at index %d\n", i);

        }

    }

    return 0;

}
```

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Output:

Pattern matches at 6

Pattern matches at 25

Pattern matches at 39

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Program:
```
#include <stdio.h>
#include <conio.h>
#include <string.h>

#define tonum(c) (c >= 'A' && c <= 'Z' ? c - 'A' : c - 'a' + 26)

int mod(int a, int p, int m) {
    int sqr;

    if (p == 0)
        return 1;

    sqr = mod(a, p / 2, m) % m;
    sqr = (sqr * sqr) % m;

    if (p & 1)
        return ((a % m) * sqr) % m;
    else
        return sqr;
}

int RabinKarpMatch(char *T, char *P, int d, int q) {
    int i, j, p, t, n, m, h, found;
    n = strlen(T);
    m = strlen(P);
    h = mod(d, m - 1, q);
    p = t = 0;

    // Preprocessing the pattern and the first window of the text
    for (i = 0; i < m; i++) {
        p = (d * p + tonum(P[i])) % q;
        t = (d * t + tonum(T[i])) % q;
    }

    // Searching the pattern in the text
    for (i = 0; i <= n - m; i++) {
        if (p == t) {
            found = 1;

            // Check if the pattern matches character by character
            for (j = 0; j < m; j++) {
```

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Batch: A1

```c
            if (P[j] != T[i + j]) {
                found = 0;
                break;
            }
        }

        if (found)
            return i;
    } else {
      // Update t for the next window
      t = (d * (t - ((tonum(T[i]) * h) % q)) + tonum(T[i + m])) % q;
    }
  }

  return -1;
}

void main() {
  char str[100], p[100];
  int ans, q;

  clrscr();

  printf("\n Enter String: ");
  gets(str);

  printf("\n Enter Pattern you want to search in the string: ");
  gets(p);

  printf("\n Enter value of q: ");
  scanf("%d", &q);

  ans = RabinKarpMatch(str, p, 10, q);

  if (ans == -1)
    printf("\n Pattern is not found.");
  else
    printf("\n Pattern is found at displacement: %d", ans);

  getch();
}
```

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Output:
Enter String: Rabin karp algorithm for pattern matching

Enter Pattern you want to search into string: pattern

Enter value of q: 11

Pattern is found at displacement: 25

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T = Text

1	0	1	1	1	0	1	1	1	0

S=0

1	1	1

P = Pattern

1	0	1	1	1	0	1	1	1	0

S=1

1	1	1

1	0	1	1	1	0	1	1	1	0

S =2

1	1	1

So, S=2 is a Valid Shift

1	0	1	1	1	0	1	1	1	0

S =3

1	1	1

1	0	1	1	1	0	1	1	1	0

S =4

1	1	1

1	0	1	1	1	0	1	1	1	0

S =5

1	1	1

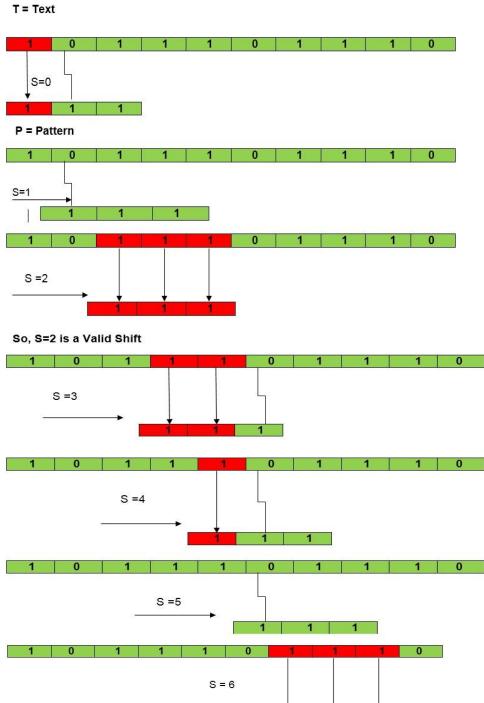| 1	0	1	1	1	0	1	1	1	0

S = 6

1	1	1

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