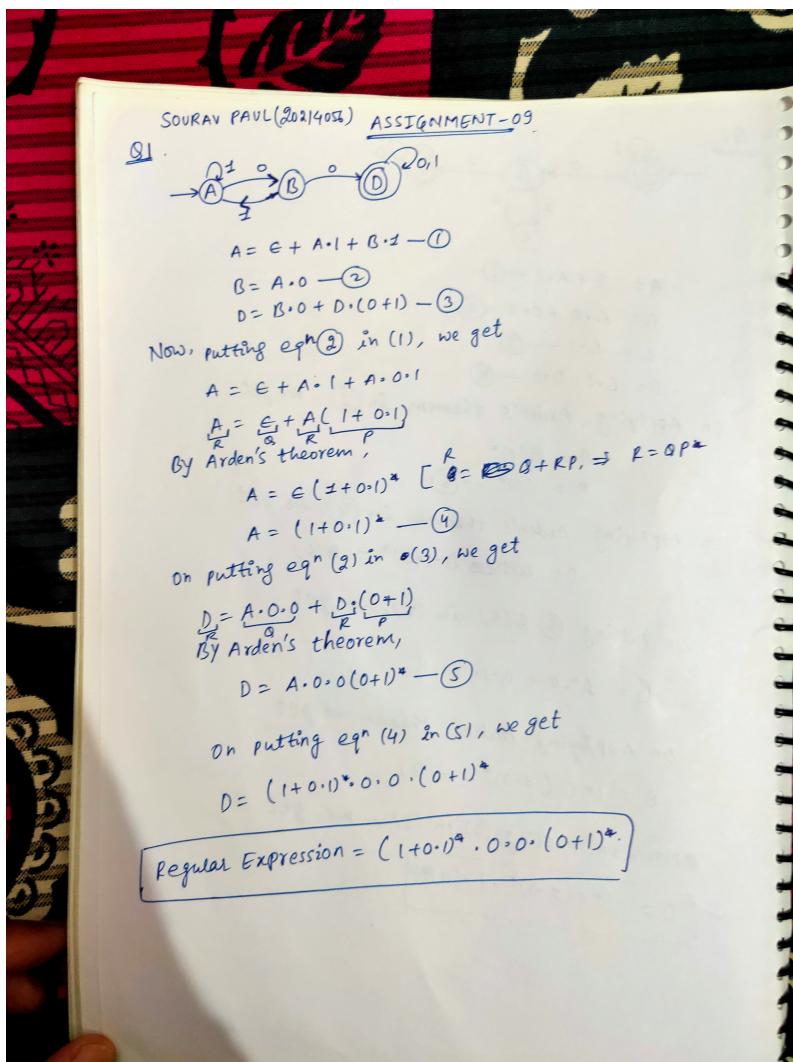


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ASSIGNMENT - 09

Q1. Convert the DFA into regular expression with the help of ARDEN' Lemma(ARDEN'THEOREM) and write the C Program conversion.



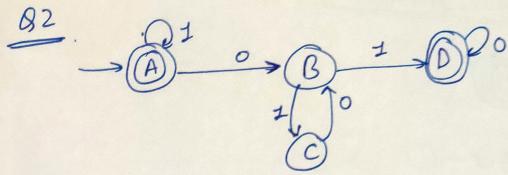
Ans:-

```
#include <stdio.h>
int main()
{
int n, flag = 0;
printf("Enter the size of given string : ");
scanf("%d", &n);
char str[n];
printf("Enter the string : ");
scanf("%s", str);
for (int i = 1; i < n; i++)
{
if (str[i] == '0' && str[i + 1] == '0') {
    flag = 1;
    break;
}
// printf("%s", str);
if (flag) {
printf("This string is accepted.\n");
} else
{
printf("This string is not accepted.\n");
}
return 0;
}
```

/* OUTPUT */

```
Enter the size of given string : 7
Enter the string : 1101001
This string is accepted.
souravpaul@souravs-Air assignment_09 % cd "/Users/souravpaul/Automata_Lab/tomata_Lab/assignment_09/"q1
Enter the size of given string : 7
Enter the string : 1010110
This string is not accepted.
```

Q2)



$$A = \epsilon + A \cdot 1 \quad (1)$$

$$B = A \cdot 0 + C \cdot 0 \quad (2)$$

$$C = B \cdot 1 \quad (3)$$

$$D = B \cdot 1 + D \cdot 0 \quad (4)$$

on Applying Arden's theorem in (1), we get

$$A = \epsilon(1)^*$$

$$A = (1)^* \quad (5)$$

on Applying Arden's theorem in (4), we get

$$D = \cancel{B \cdot 1} B \cdot 1 \cdot (0)^* \quad (6)$$

on putting (3) & (5) in (2), we get

$$B = 1^* \cdot 0 + B \cdot 1 \cdot 0$$

on Applying Arden's theorem we get

$$B = 1^* \cdot 0 (1 \cdot 0)^* \quad (7)$$

Now, on putting (7) in (6), we get

$$\boxed{D = 1^* \cdot 0 (1 \cdot 0)^* \cdot 1 \cdot (0)^*}$$

ANS:-

```
#include <stdio.h>
#include <stdbool.h>
int main()
{
    int n;
    printf("Enter the size of given string : ");
    scanf("%d", &n);
    printf("Enter the string : ");
    char str[n];
    scanf("%s", str);
    char res = 'a';
    if (n == 0)
    {
        res = 'a';
    }
    else
    {
        for (int i = 0; i < n; i++)
        {
            char x = str[i];
            if (x == '0' && res == 'a') {
                res = 'b';
            }
            else if (x == '1' && res == 'a') {
                res = 'a';
            }
            else if (x == '0' && res == 'b') {
                res = 'e';
            }
            else if (x == '1' && res == 'b') {
                res = 'c';
            }
            else if (x == '0' && res == 'c') {
                res = 'B';
            }
            else if (x == '1' && res == 'c') {
                res = 'e';
            }
            else if (x == '0' && res == 'B') {
                res = 'd';
            }
            else if (x == '1' && res == 'B') {
                res = 'c';
            }
        }
    }
}
```

```

    }
    else if (x == '0' && res == 'd') {
        res = 'd';
    }
    else if (x == '1' && res == 'd') {
        res = 'e';
    }
    else if (x == '0' && res == 'e') {
        res = 'e';
    }
    else
    {
        res = 'e';
    }
}
}

if (res == 'a' || res == 'c' || res == 'B' || res == 'd') {
    printf("This string is accepted.");
} else
{
    printf(" This string is not accepted.");
}
return 0;
}

```

/*OUTPUT */

```

Enter the size of given string : 7
Enter the string : 1101010
This string is accepted.%s
souravpaul@souravs-Air assignment_09 % cd "/Users/souravpaul/Automata_Lab"
tomata_Lab/assignment_09/"q2
Enter the size of given string : 7
Enter the string : 1001000
This string is not accepted.%s

```