LAB EXERCISE – 6

(1) /* C++ Program to implement a PDA which accepts strings of the form {a^(n)b^(n) | where n > 0} */

```
#include <iostream>
#include <stack>
#include <cstring>
using namespace std;
stack<char> s;
int pda = 0;
void state2()
{
   cout <<"At State 2\n";
   if (s.top() == '$') {
      s.pop();
      pda = 2;
   }
   else{
      pda = -1;
   }
}

void state0(char c)
{
```

```
    cout << "At State 0\n";
    if (c == 'a') {
        s.push('a');
        cout << "Going state 0\n";
        pda = 0;
    }
    else if (c == 'b') {
        if(s.top() == 'a')
        {
            s.pop();
            cout << "Going State 1\n";
            pda = 1;
        }
    }
    else {
        pda = -1;
    }
}
void state1(char c)
{
    cout <<"At State 1\n";
    if (c == 'b'&& s.top() != '$') {
        if(s.top() == 'a'){
        s.pop();
```

```
        cout <<"Going State 1\n";
        pda = 1 ;
        }
    }
    else{
        state2();
    }
    }
int isAccepted(char str[])
{
    // store length of string
    int i, len = strlen(str);
    for (i = 0; i <= len; i++) {
        if (pda == 0)
            state0(str[i]);
        else if (pda == 1)
            state1(str[i]);
        else
            return 0;
    }
    if (pda == 0 || pda == 2)
        return 1;
    else
        return 0;
```

```
}



int main()
{
   s.push('$');
   char str[100];
   cout << "Enter string: ";
   cin >> str;
   if (isAccepted(str))
      cout << "ACCEPTED";
   else
      cout << "NOT ACCEPTED";
   return 0;
}
```

(2) /*C++ Program to implement a PDA which accepts even palindrome of the form {ww^(r) | where |w| > 0} */

```
#include <iostream>
#include <stack>
#include <cstring>
using namespace std;
```

```
stack<char> s;
int pda = 0;
void state2()
{
   cout <<"At State 2\n";
   if (s.top() == '$') {
      s.pop();
      pda = 2;
   }
   else{
      pda = -1;
   }
}
void state1(char c)
{
   cout <<"At State 1\n";
   if (c == 'a'&& s.top() != '$') {
      if(s.top() == 'a'){
      s.pop();
      cout <<"Going State 1\n";
      pda = 1 ;
      }
   }
   else if(c == 'b' && s.top() != '$'){
```

```
        if(s.top() == 'b'){
        s.pop();
        cout <<"Going State 1\n";
        pda = 1 ;
        }
    }
    else{
        state2();
    }
}
void state0(char c, bool flag)
{
    if(flag){
        state1(c);
    }
    else{
        cout << "At State 0\n";
        if (c == 'a') {
            s.push('a');
            cout << "Going state 0\n";
            pda = 0;
        }
        else if (c == 'b') {
            s.push('b');
```

```
            cout << "Going state 0\n";
            pda = 0;
        }
        else {
            pda = -1;
        }
    }
}
int isAccepted(char str[])
{
    // store length of string
    int i, len = strlen(str);
    int half = len/2;
    for (i = 0; i <= len; i++) {
        if(half == i){
            bool flag = true;
            if (pda == 0)
            state0(str[i], flag);

            else if (pda == 1)
                state1(str[i]);

            else
                return 0;
```

```
        }
        else{
            bool flag = false;
            if (pda == 0)
            state0(str[i], flag);

            else if (pda == 1)
                state1(str[i]);

            else
                return 0;
        }
    }
    if (pda == 0 || pda == 2)
        return 1;
    else
        return 0;
}
int main()
{
    s.push('$');
    char str[100];
    cout << "Enter string: ";
    cin >> str;
```

```
    if (isAccepted(str))
        cout << "ACCEPTED";
    else
        cout << "NOT ACCEPTED";
    return 0;
}
```