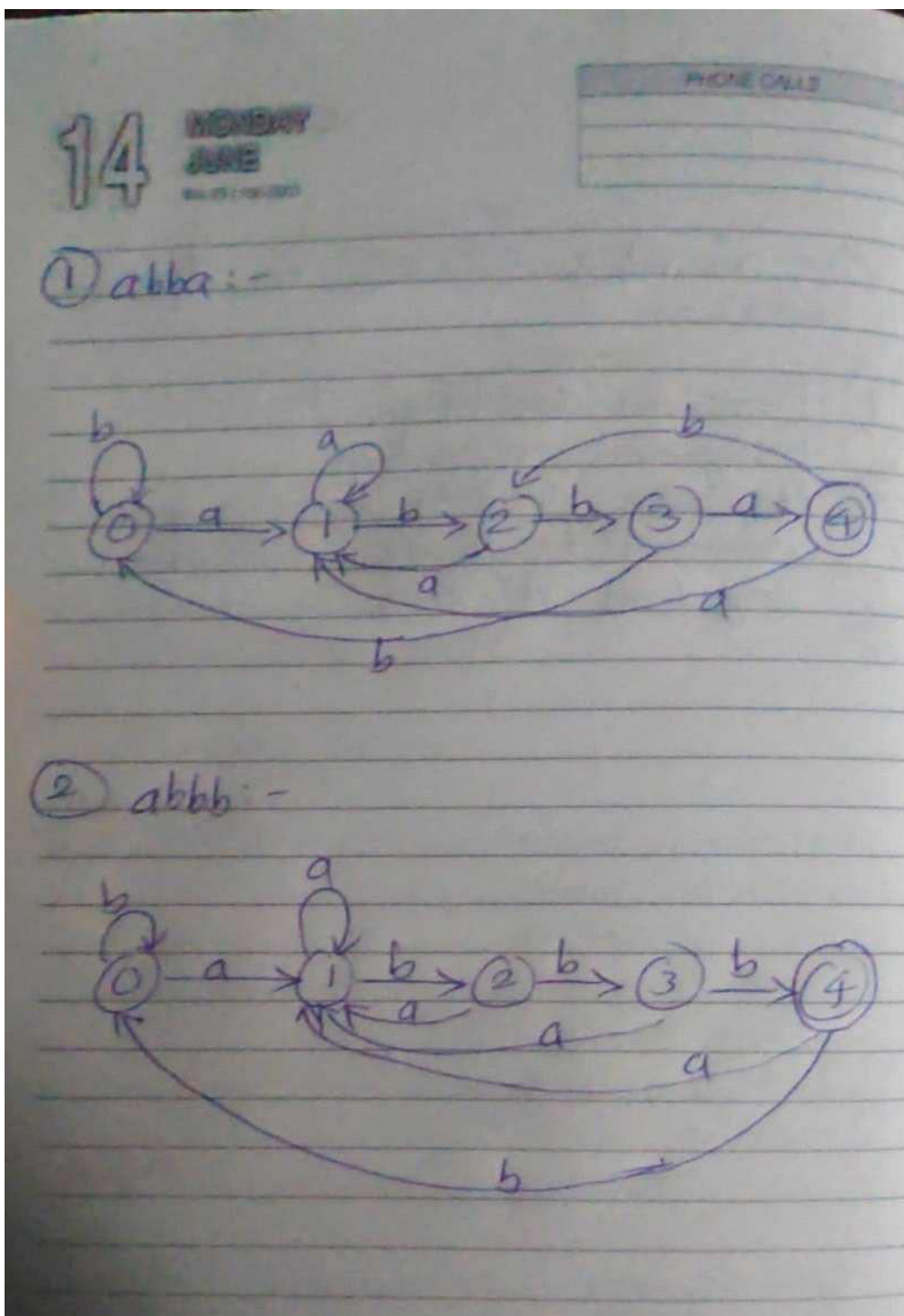# AA - Lab:-2
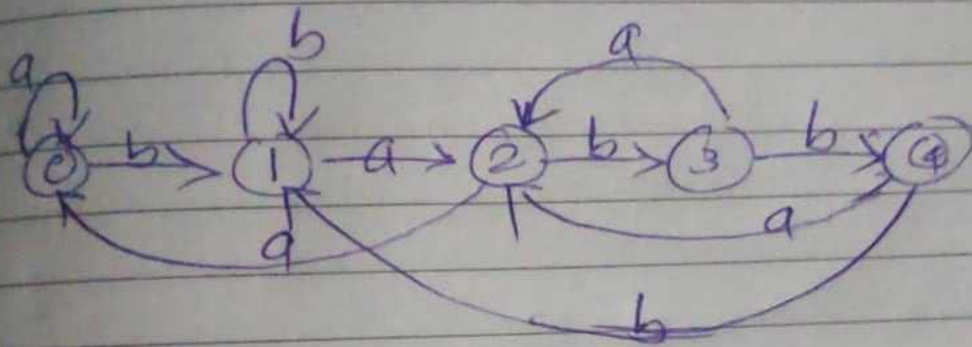
1. Construct Finite Automata for below given patterns:

Ans:-

③ babb :-

2. Obtain Transition table from Constructed Automata:-

Ans:-

i). abba

q	a	b
0	1	0
1	1	2
2	1	3
3	4	0
4	1	2

ii). abbb

q	a	b
0	1	0
1	1	2

2	1	3
3	1	4
4	1	0

iii). babb

q	a	b
0	0	1
1	2	1
2	0	3
3	2	4
4	2	1

3. Write a program for pattern matching using Finite Automata:-

Ans:-

```
#include<bits/stdc++.h> using
namespace std;
void getPatternMatch(int** TT, int m, int n, int accept_state, string T)
{
        int start = 0;
        int count = 0; //total number of pattern match in text. for (int i =
        0; i < T.length(); i++)
        {
                if (T[i] == 'a')
                start = TT[start][0]; else if (T[i]
                == 'b') start = TT[start][1];
```

```cpp
			if (start == accept_state)
			{
				cout << "\nText contains pattern at " << i – start + 1
					<< " as per Transition Table" << endl; count++;
			}
		}
		if (count == 0)
		{
			cout << "\nText does not contain pattern as per transition Table" <<
			endl;
		}
	}

int main()
{
	int m, n;
	cout << "Enter total rows of Transition table : "; cin >> m;
	cout << "Enter total columns of Transition table : "; cin >> n;
	int** arr = (int**)malloc(sizeof(int*) * m); for (int i = 0;
	i < m; i++)
	{
		arr[i] = (int*)malloc(sizeof(int) * n);
	}
```

```
for (int i = 0; i < m; i++)

{

        for (int j = 0; j < n; j++)

        {

                cin >> arr[i][j];

        }

}

int accept_state;

cout << "Enter accepting state: "; cin >>

accept_state;

string T;

cout << "Enter text: "; cin >> T;

getPatternMatch(arr, m, n, accept_state, T); return 0;

}
```

Output:-

1]. abba

```
Enter total rows of Transition table : 5
Enter total columns of Transition table : 2
1 0
1 2
1 3
4 0
1 2
Enter accepting state: 4
Enter text: abbabbabbbabbab

Text contains pattern at 0 as per Transition Table

Text contains pattern at 3 as per Transition Table

Text contains pattern at 10 as per Transition Table
```

2]. abbb

```
Enter total rows of Transition table : 5
Enter total columns of Transition table : 2
1 0
1 2
1 3
1 4
1 0
Enter accepting state: 4
Enter text: abbbaabbbabbb

Text contains pattern at 0 as per Transition Table

Text contains pattern at 5 as per Transition Table

Text contains pattern at 9 as per Transition Table
```

3]. babb

```
Enter total rows of Transition table : 5
Enter total columns of Transition table : 2
0 1
2 1
0 3
0 4
0 1
Enter accepting state: 4
Enter text: babbababbabbbba

Text contains pattern at 0 as per Transition Table
```