1. #include<stdio.h>
2. #include<stdlib.h>
3. struct node
4. {
5. struct node \*prev;
6. struct node \*next;
7. **int** data;
8. };
9. struct node \*head;
10. **void** insertion\_beginning();
11. **void** insertion\_last();
12. **void** insertion\_specified();
13. **void** deletion\_beginning();
14. **void** deletion\_last();
15. **void** deletion\_specified();
16. **void** display();
17. **void** search();
18. **void** main ()
19. {
20. **int** choice =0;
21. **while**(choice != 9)
22. {
23. printf("\n\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*\n");
24. printf("\nChoose one option from the following list ...\n");
25. printf("\n===============================================\n");
26. printf("\n1.Insert in begining\n2.Insert at last\n3.Insert at any random location\n4.Delete from Beginning\n
27. 5.Delete from last\n6.Delete the node after the given data\n7.Search\n8.Show\n9.Exit\n");
28. printf("\nEnter your choice?\n");
29. scanf("\n%d",&choice);
30. **switch**(choice)
31. {
32. **case** 1:
33. insertion\_beginning();
34. **break**;
35. **case** 2:
36. insertion\_last();
37. **break**;
38. **case** 3:
39. insertion\_specified();
40. **break**;
41. **case** 4:
42. deletion\_beginning();
43. **break**;
44. **case** 5:
45. deletion\_last();
46. **break**;
47. **case** 6:
48. deletion\_specified();
49. **break**;
50. **case** 7:
51. search();
52. **break**;
53. **case** 8:
54. display();
55. **break**;
56. **case** 9:
57. exit(0);
58. **break**;
59. **default**:
60. printf("Please enter valid choice..");
61. }
62. }
63. }
64. **void** insertion\_beginning()
65. {
66. struct node \*ptr;
67. **int** item;
68. ptr = (struct node \*)malloc(sizeof(struct node));
69. **if**(ptr == NULL)
70. {
71. printf("\nOVERFLOW");
72. }
73. **else**
74. {
75. printf("\nEnter Item value");
76. scanf("%d",&item);
78. **if**(head==NULL)
79. {
80. ptr->next = NULL;
81. ptr->prev=NULL;
82. ptr->data=item;
83. head=ptr;
84. }
85. **else**
86. {
87. ptr->data=item;
88. ptr->prev=NULL;
89. ptr->next = head;
90. head->prev=ptr;
91. head=ptr;
92. }
93. printf("\nNode inserted\n");
94. }
96. }
97. **void** insertion\_last()
98. {
99. struct node \*ptr,\*temp;
100. **int** item;
101. ptr = (struct node \*) malloc(sizeof(struct node));
102. **if**(ptr == NULL)
103. {
104. printf("\nOVERFLOW");
105. }
106. **else**
107. {
108. printf("\nEnter value");
109. scanf("%d",&item);
110. ptr->data=item;
111. **if**(head == NULL)
112. {
113. ptr->next = NULL;
114. ptr->prev = NULL;
115. head = ptr;
116. }
117. **else**
118. {
119. temp = head;
120. **while**(temp->next!=NULL)
121. {
122. temp = temp->next;
123. }
124. temp->next = ptr;
125. ptr ->prev=temp;
126. ptr->next = NULL;
127. }
129. }
130. printf("\nnode inserted\n");
131. }
132. **void** insertion\_specified()
133. {
134. struct node \*ptr,\*temp;
135. **int** item,loc,i;
136. ptr = (struct node \*)malloc(sizeof(struct node));
137. **if**(ptr == NULL)
138. {
139. printf("\n OVERFLOW");
140. }
141. **else**
142. {
143. temp=head;
144. printf("Enter the location");
145. scanf("%d",&loc);
146. **for**(i=0;i<loc;i++)
147. {
148. temp = temp->next;
149. **if**(temp == NULL)
150. {
151. printf("\n There are less than %d elements", loc);
152. **return**;
153. }
154. }
155. printf("Enter value");
156. scanf("%d",&item);
157. ptr->data = item;
158. ptr->next = temp->next;
159. ptr -> prev = temp;
160. temp->next = ptr;
161. temp->next->prev=ptr;
162. printf("\nnode inserted\n");
163. }
164. }
165. **void** deletion\_beginning()
166. {
167. struct node \*ptr;
168. **if**(head == NULL)
169. {
170. printf("\n UNDERFLOW");
171. }
172. **else** **if**(head->next == NULL)
173. {
174. head = NULL;
175. free(head);
176. printf("\nnode deleted\n");
177. }
178. **else**
179. {
180. ptr = head;
181. head = head -> next;
182. head -> prev = NULL;
183. free(ptr);
184. printf("\nnode deleted\n");
185. }
187. }
188. **void** deletion\_last()
189. {
190. struct node \*ptr;
191. **if**(head == NULL)
192. {
193. printf("\n UNDERFLOW");
194. }
195. **else** **if**(head->next == NULL)
196. {
197. head = NULL;
198. free(head);
199. printf("\nnode deleted\n");
200. }
201. **else**
202. {
203. ptr = head;
204. **if**(ptr->next != NULL)
205. {
206. ptr = ptr -> next;
207. }
208. ptr -> prev -> next = NULL;
209. free(ptr);
210. printf("\nnode deleted\n");
211. }
212. }
213. **void** deletion\_specified()
214. {
215. struct node \*ptr, \*temp;
216. **int** val;
217. printf("\n Enter the data after which the node is to be deleted : ");
218. scanf("%d", &val);
219. ptr = head;
220. **while**(ptr -> data != val)
221. ptr = ptr -> next;
222. **if**(ptr -> next == NULL)
223. {
224. printf("\nCan't delete\n");
225. }
226. **else** **if**(ptr -> next -> next == NULL)
227. {
228. ptr ->next = NULL;
229. }
230. **else**
231. {
232. temp = ptr -> next;
233. ptr -> next = temp -> next;
234. temp -> next -> prev = ptr;
235. free(temp);
236. printf("\nnode deleted\n");
237. }
238. }
239. **void** display()
240. {
241. struct node \*ptr;
242. printf("\n printing values...\n");
243. ptr = head;
244. **while**(ptr != NULL)
245. {
246. printf("%d\n",ptr->data);
247. ptr=ptr->next;
248. }
249. }
250. **void** search()
251. {
252. struct node \*ptr;
253. **int** item,i=0,flag;
254. ptr = head;
255. **if**(ptr == NULL)
256. {
257. printf("\nEmpty List\n");
258. }
259. **else**
260. {
261. printf("\nEnter item which you want to search?\n");
262. scanf("%d",&item);
263. **while** (ptr!=NULL)
264. {
265. **if**(ptr->data == item)
266. {
267. printf("\nitem found at location %d ",i+1);
268. flag=0;
269. **break**;
270. }
271. **else**
272. {
273. flag=1;
274. }
275. i++;
276. ptr = ptr -> next;
277. }
278. **if**(flag==1)
279. {
280. printf("\nItem not found\n");
281. }
282. }
284. }

OUTPUT

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

8

printing values...

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

1

Enter Item value12

Node inserted

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

1

Enter Item value123

Node inserted

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

1

Enter Item value1234

Node inserted

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

8

printing values...

1234

123

12

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

2

Enter value89

node inserted

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

3

Enter the location1

Enter value12345

node inserted

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

8

printing values...

1234

123

12345

12

89

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

4

node deleted

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

5

node deleted

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

8

printing values...

123

12345

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

6

Enter the data after which the node is to be deleted : 123

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

8

printing values...

123

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

7

Enter item which you want to search?

123

item found at location 1

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

6

Enter the data after which the node is to be deleted : 123

Can't delete

\*\*\*\*\*\*\*\*\*Main Menu\*\*\*\*\*\*\*\*\*

Choose one option from the following list ...

===============================================

1.Insert in begining

2.Insert at last

3.Insert at any random location

4.Delete from Beginning

5.Delete from last

6.Delete the node after the given data

7.Search

8.Show

9.Exit

Enter your choice?

9

Exited..