



```
import java.util.*;  
//  
public class linkList {  
    public static void main(String[] args) {  
        LinkedList<Integer> list = new LinkedList<>();  
        list.addFirst(1);  
        list.addFirst(2);  
        list.addFirst(3);  
        list.addFirst(4);  
        list.addFirst(5);  
        list.addFirst(6);  
        list.addFirst(7);  
        list.addFirst(8);  
        list.addFirst(9);  
        list.addFirst(10);  
        list.addFirst(11);  
        list.addFirst(12);  
        list.addFirst(13);  
        list.addFirst(14);  
        list.addFirst(15);  
        list.addFirst(16);  
        list.addFirst(17);  
        list.addFirst(18);  
        list.addFirst(19);  
        list.addFirst(20);  
        list.addFirst(21);  
        list.addFirst(22);  
        list.addFirst(23);  
        list.addFirst(24);  
        list.addFirst(25);  
        list.addFirst(26);  
        list.addFirst(27);  
        list.addFirst(28);  
        list.addFirst(29);  
        list.addFirst(30);  
        list.addFirst(31);  
        list.addFirst(32);  
        list.addFirst(33);  
        list.addFirst(34);  
        list.addFirst(35);  
        list.addFirst(36);  
        list.addFirst(37);  
        list.addFirst(38);  
        list.addFirst(39);  
        list.addFirst(40);  
        list.addFirst(41);  
        list.addFirst(42);  
        list.addFirst(43);  
        list.addFirst(44);  
        list.addFirst(45);  
        list.addFirst(46);  
        list.addFirst(47);  
        list.addFirst(48);  
        list.addFirst(49);  
        list.addFirst(50);  
        list.addFirst(51);  
        list.addFirst(52);  
        list.addFirst(53);  
        list.addFirst(54);  
        list.addFirst(55);  
        list.addFirst(56);  
        list.addFirst(57);  
        list.addFirst(58);  
        list.addFirst(59);  
        list.addFirst(60);  
        list.addFirst(61);  
        list.addFirst(62);  
        list.addFirst(63);  
        list.addFirst(64);  
        list.addFirst(65);  
        list.addFirst(66);  
        list.addFirst(67);  
        list.addFirst(68);  
        list.addFirst(69);  
        list.addFirst(70);  
        list.addFirst(71);  
        list.addFirst(72);  
        list.addFirst(73);  
        list.addFirst(74);  
        list.addFirst(75);  
        list.addFirst(76);  
        list.addFirst(77);  
        list.addFirst(78);  
        list.addFirst(79);  
        list.addFirst(80);  
        list.addFirst(81);  
        list.addFirst(82);  
        list.addFirst(83);  
        list.addFirst(84);  
        list.addFirst(85);  
        list.addFirst(86);  
        list.addFirst(87);  
        list.addFirst(88);  
        list.addFirst(89);  
        list.addFirst(90);  
        list.addFirst(91);  
        list.addFirst(92);  
        list.addFirst(93);  
        list.addFirst(94);  
        list.addFirst(95);  
        list.addFirst(96);  
        list.addFirst(97);  
        list.addFirst(98);  
        list.addFirst(99);  
        list.addFirst(100);  
        System.out.println(list);  
    }  
}
```

The Code

```
public void reverse() {  
    if (head == null) {  
        return;  
    }  
    Node curr = head;  
    Node prev = null;  
    while (curr != null) {  
        next = curr.next;  
        curr.next = prev;  
        prev = curr;  
        curr = next;  
    }  
    head = prev;
```

```
{1 2 3 4 5} n = 2  
that means 2 must be removed. In other words from start it will be Size-(n+1).  
Idea is to link 3.next to 5. i.e. prevNode of n is link to nextNode of n.  
Output: 1235.
```

```
int size = 0;  
Node head = null;  
Node curr = null;  
while (itr != null) {  
    curr = itr.next;  
    if (itr.data == 1) {  
        head = head.next // removal of first  
        return;  
    }  
    int forward = size-(n+1);  
    int i = head;  
    for (i = 0; i < forward; i++) {  
        i++;  
        itr = itr.next;  
    }  
    itr.next = curr.next;
```

```
public boolean isPalindrome() {  
    ArrayList<Integer> list = new ArrayList<>();  
    Node head = null;  
    while (itr != null) {  
        list.add(itr.data);  
        itr = itr.next;  
    }  
    int j = list.size()-1;  
    while (j >= 0) {  
        if (list.get(j) != list.get(i)) {  
            return false;  
        }  
        j--;  
    }  
    return true;
```

```
public boolean checkPalindrome() {  
    if (head.next == null) {  
        return true;  
    }  
    // step 1: find mid:  
    Node mid = findMid(head);  
    // step 2: reverse 2nd half:  
    Node curr = mid;  
    Node prev = null;  
    while (curr != null) {  
        next = curr.next;  
        curr.next = prev;  
        prev = curr;  
        curr = next;  
    }  
    mid = prev;  
    // step 3: check 1st and 2nd half:  
    Node left = mid;  
    Node right = head;  
    while (left != null) {  
        if (left.data != right.data) {  
            return false;  
        }  
        right = right.next;  
        left = left.next;  
    }  
    return true;
```

```
public Node findMid(Node head) {  
    Node slow = head;  
    Node fast = head;  
  
    while (fast != null && fast.next != null) {  
        slow = slow.next;  
        fast = fast.next.next;  
    }  
  
    Node middle = slow;  
    return middle;
```

```
public boolean isCycle(Node head) {  
    Node slow = head;  
    Node fast = head;  
  
    while (slow != fast && fast.next != null) {  
        slow = slow.next;  
        fast = fast.next.next;  
        if (slow == fast) {  
            return true;  
        }  
    }  
    return false;
```

```
public void removeCycle(Node head) {  
    Node slow = head;  
    Node fast = head;  
  
    while (fast != null && fast.next != null) {  
        slow = slow.next;  
        fast = fast.next.next;  
  
        if (slow == fast) {  
            Node fastPrv = fast;  
            slow = head;  
            while (fastPrv != fast) {  
                fastPrv = fast;  
                slow = slow.next;  
                fast = fast.next;  
            }  
            fastPrv.next = null;  
        }  
    }
```

```
public void makeCycle(Node head) {  
    Node itr = head;  
    Node point = null;  
    while (itr.next != null) {  
        if (itr.data == 3) {  
            point = itr;  
        }  
        itr = itr.next;  
    }  
    itr.next = point;
```

Link_List

```
public class linkList {  
    public static void main(String[] args) {  
        Node head = null;  
        Node curr = null;  
        Node next = null;  
        Node prev = null;  
        Node temp = null;  
        Node fast = null;  
        Node slow = null;  
        Node point = null;  
        Node fastPrv = null;  
        Node fastCur = null;  
        Node fastNxt = null;  
        Node fastLst = null;  
        Node fastMid = null;  
        Node fastFwd = null;  
        Node fastBwd = null;  
        Node fastCrd = null;  
        Node fastCrd2 = null;  
        Node fastCrd3 = null;  
        Node fastCrd4 = null;  
        Node fastCrd5 = null;  
        Node fastCrd6 = null;  
        Node fastCrd7 = null;  
        Node fastCrd8 = null;  
        Node fastCrd9 = null;  
        Node fastCrd10 = null;  
        Node fastCrd11 = null;  
        Node fastCrd12 = null;  
        Node fastCrd13 = null;  
        Node fastCrd14 = null;  
        Node fastCrd15 = null;  
        Node fastCrd16 = null;  
        Node fastCrd17 = null;  
        Node fastCrd18 = null;  
        Node fastCrd19 = null;  
        Node fastCrd20 = null;  
        Node fastCrd21 = null;  
        Node fastCrd22 = null;  
        Node fastCrd23 = null;  
        Node fastCrd24 = null;  
        Node fastCrd25 = null;  
        Node fastCrd26 = null;  
        Node fastCrd27 = null;  
        Node fastCrd28 = null;  
        Node fastCrd29 = null;  
        Node fastCrd30 = null;  
        Node fastCrd31 = null;  
        Node fastCrd32 = null;  
        Node fastCrd33 = null;  
        Node fastCrd34 = null;  
        Node fastCrd35 = null;  
        Node fastCrd36 = null;  
        Node fastCrd37 = null;  
        Node fastCrd38 = null;  
        Node fastCrd39 = null;  
        Node fastCrd40 = null;  
        Node fastCrd41 = null;  
        Node fastCrd42 = null;  
        Node fastCrd43 = null;  
        Node fastCrd44 = null;  
        Node fastCrd45 = null;  
        Node fastCrd46 = null;  
        Node fastCrd47 = null;  
        Node fastCrd48 = null;  
        Node fastCrd49 = null;  
        Node fastCrd50 = null;  
        Node fastCrd51 = null;  
        Node fastCrd52 = null;  
        Node fastCrd53 = null;  
        Node fastCrd54 = null;  
        Node fastCrd55 = null;  
        Node fastCrd56 = null;  
        Node fastCrd57 = null;  
        Node fastCrd58 = null;  
        Node fastCrd59 = null;  
        Node fastCrd60 = null;  
        Node fastCrd61 = null;  
        Node fastCrd62 = null;  
        Node fastCrd63 = null;  
        Node fastCrd64 = null;  
        Node fastCrd65 = null;  
        Node fastCrd66 = null;  
        Node fastCrd67 = null;  
        Node fastCrd68 = null;  
        Node fastCrd69 = null;  
        Node fastCrd70 = null;  
        Node fastCrd71 = null;  
        Node fastCrd72 = null;  
        Node fastCrd73 = null;  
        Node fastCrd74 = null;  
        Node fastCrd75 = null;  
        Node fastCrd76 = null;  
        Node fastCrd77 = null;  
        Node fastCrd78 = null;  
        Node fastCrd79 = null;  
        Node fastCrd80 = null;  
        Node fastCrd81 = null;  
        Node fastCrd82 = null;  
        Node fastCrd83 = null;  
        Node fastCrd84 = null;  
        Node fastCrd85 = null;  
        Node fastCrd86 = null;  
        Node fastCrd87 = null;  
        Node fastCrd88 = null;  
        Node fastCrd89 = null;  
        Node fastCrd90 = null;  
        Node fastCrd91 = null;  
        Node fastCrd92 = null;  
        Node fastCrd93 = null;  
        Node fastCrd94 = null;  
        Node fastCrd95 = null;  
        Node fastCrd96 = null;  
        Node fastCrd97 = null;  
        Node fastCrd98 = null;  
        Node fastCrd99 = null;  
        Node fastCrd100 = null;  
        Node fastCrd101 = null;  
        Node fastCrd102 = null;  
        Node fastCrd103 = null;  
        Node fastCrd104 = null;  
        Node fastCrd105 = null;  
        Node fastCrd106 = null;  
        Node fastCrd107 = null;  
        Node fastCrd108 = null;  
        Node fastCrd109 = null;  
        Node fastCrd110 = null;  
        Node fastCrd111 = null;  
        Node fastCrd112 = null;  
        Node fastCrd113 = null;  
        Node fastCrd114 = null;  
        Node fastCrd115 = null;  
        Node fastCrd116 = null;  
        Node fastCrd117 = null;  
        Node fastCrd118 = null;  
        Node fastCrd119 = null;  
        Node fastCrd120 = null;  
        Node fastCrd121 = null;  
        Node fastCrd122 = null;  
        Node fastCrd123 = null;  
        Node fastCrd124 = null;  
        Node fastCrd125 = null;  
        Node fastCrd126 = null;  
        Node fastCrd127 = null;  
        Node fastCrd128 = null;  
        Node fastCrd129 = null;  
        Node fastCrd130 = null;  
        Node fastCrd131 = null;  
        Node fastCrd132 = null;  
        Node fastCrd133 = null;  
        Node fastCrd134 = null;  
        Node fastCrd135 = null;  
        Node fastCrd136 = null;  
        Node fastCrd137 = null;  
        Node fastCrd138 = null;  
        Node fastCrd139 = null;  
        Node fastCrd140 = null;  
        Node fastCrd141 = null;  
        Node fastCrd142 = null;  
        Node fastCrd143 = null;  
        Node fastCrd144 = null;  
        Node fastCrd145 = null;  
        Node fastCrd146 = null;  
        Node fastCrd147 = null;  
        Node fastCrd148 = null;  
        Node fastCrd149 = null;  
        Node fastCrd150 = null;  
        Node fastCrd151 = null;  
        Node fastCrd152 = null;  
        Node fastCrd153 = null;  
        Node fastCrd154 = null;  
        Node fastCrd155 = null;  
        Node fastCrd156 = null;  
        Node fastCrd157 = null;  
        Node fastCrd158 = null;  
        Node fastCrd159 = null;  
        Node fastCrd160 = null;  
        Node fastCrd161 = null;  
        Node fastCrd162 = null;  
        Node fastCrd163 = null;  
        Node fastCrd164 = null;  
        Node fastCrd165 = null;  
        Node fastCrd166 = null;  
        Node fastCrd167 = null;  
        Node fastCrd168 = null;  
        Node fastCrd169 = null;  
        Node fastCrd170 = null;  
        Node fastCrd171 = null;  
        Node fastCrd172 = null;  
        Node fastCrd173 = null;  
        Node fastCrd174 = null;  
        Node fastCrd175 = null;  
        Node fastCrd176 = null;  
        Node fastCrd177 = null;  
        Node fastCrd178 = null;  
        Node fastCrd179 = null;  
        Node fastCrd180 = null;  
        Node fastCrd181 = null;  
        Node fastCrd182 = null;  
        Node fastCrd183 = null;  
        Node fastCrd184 = null;  
        Node fastCrd185 = null;  
        Node fastCrd186 = null;  
        Node fastCrd187 = null;  
        Node fastCrd188 = null;  
        Node fastCrd189 = null;  
        Node fastCrd190 = null;  
        Node fastCrd191 = null;  
        Node fastCrd192 = null;  
        Node fastCrd193 = null;  
        Node fastCrd194 = null;  
        Node fastCrd195 = null;  
        Node fastCrd196 = null;  
        Node fastCrd197 = null;  
        Node fastCrd198 = null;  
        Node fastCrd199 = null;  
        Node fastCrd200 = null;  
        Node fastCrd201 = null;  
        Node fastCrd202 = null;  
        Node fastCrd203 = null;  
        Node fastCrd204 = null;  
        Node fastCrd205 = null;  
        Node fastCrd206 = null;  
        Node fastCrd207 = null;  
        Node fastCrd208 = null;  
        Node fastCrd209 = null;  
        Node fastCrd210 = null;  
        Node fastCrd211 = null;  
        Node fastCrd212 = null;  
        Node fastCrd213 = null;  
        Node fastCrd214 = null;  
        Node fastCrd215 = null;  
        Node fastCrd216 = null;  
        Node fastCrd217 = null;  
        Node fastCrd218 = null;  
        Node fastCrd219 = null;  
        Node fastCrd220 = null;  
        Node fastCrd221 = null;  
        Node fastCrd222 = null;  
        Node fastCrd223 = null;  
        Node fastCrd224 = null;  
        Node fastCrd225 = null;  
        Node fastCrd226 = null;  
        Node fastCrd227 = null;  
        Node fastCrd228 = null;  
        Node fastCrd229 = null;  
        Node fastCrd230 = null;  
        Node fastCrd231 = null;  
        Node fastCrd232 = null;  
        Node fastCrd233 = null;  
        Node fastCrd234 = null;  
        Node fastCrd235 = null;  
        Node fastCrd236 = null;  
        Node fastCrd237 = null;  
        Node fastCrd238 = null;  
        Node fastCrd239 = null;  
        Node fastCrd240 = null;  
        Node fastCrd241 = null;  
        Node fastCrd242 = null;  
        Node fastCrd243 = null;  
        Node fastCrd244 = null;  
        Node fastCrd245 = null;  
        Node fastCrd246 = null;  
        Node fastCrd247 = null;  
        Node fastCrd248 = null;  
        Node fastCrd249 = null;  
        Node fastCrd250 = null;  
        Node fastCrd251 = null;  
        Node fastCrd252 = null;  
        Node fastCrd253 = null;  
        Node fastCrd254 = null;  
        Node fastCrd255 = null;  
        Node fastCrd256 = null;  
        Node fastCrd257 = null;  
        Node fastCrd258 = null;  
        Node fastCrd259 = null;  
        Node fastCrd260 = null;  
        Node fastCrd261 = null;  
        Node fastCrd262 = null;  
        Node fastCrd263 = null;  
        Node fastCrd264 = null;  
        Node fastCrd265 = null;  
        Node fastCrd266 = null;  
        Node fastCrd267 = null;  
        Node fastCrd268 = null;  
        Node fastCrd269 = null;  
        Node fastCrd270 = null;  
        Node fastCrd271 = null;  
        Node fastCrd272 = null;  
        Node fastCrd273 = null;  
        Node fastCrd274 = null;  
        Node fastCrd275 = null;  
        Node fastCrd276 = null;  
        Node fastCrd277 = null;  
        Node fastCrd278 = null;  
        Node fastCrd279 = null;  
        Node fastCrd280 = null;  
        Node fastCrd281 = null;  
        Node fastCrd282 = null;  
        Node fastCrd283 = null;  
        Node fastCrd284 = null;  
        Node fastCrd285 = null;  
        Node fastCrd286 = null;  
        Node fastCrd287 = null;  
        Node fastCrd288 = null;  
        Node fastCrd289 = null;  
        Node fastCrd290 = null;  
        Node fastCrd291 = null;  
        Node fastCrd292 = null;  
        Node fastCrd293 = null;  
        Node fastCrd294 = null;  
        Node fastCrd295 = null;  
        Node fastCrd296 = null;  
        Node fastCrd297 = null;  
        Node fastCrd298 = null;  
        Node fastCrd299 = null;  
        Node fastCrd300 = null;  
        Node fastCrd301 = null;  
        Node fastCrd302 = null;  
        Node fastCrd303 = null;  
        Node fastCrd304 = null;  
        Node fastCrd305 = null;  
        Node fastCrd306 = null;  
        Node fastCrd307 = null;  
        Node fastCrd308 = null;  
        Node fastCrd309 = null;  
        Node fastCrd310 = null;  
        Node fastCrd311 = null;  
        Node fastCrd312 = null;  
        Node fastCrd313 = null;  
        Node fastCrd314 = null;  
        Node fastCrd315 = null;  
        Node fastCrd316 = null;  
        Node fastCrd317 = null;  
        Node fastCrd318 = null;  
        Node fastCrd319 = null;  
        Node fastCrd320 = null;  
        Node fastCrd321 = null;  
        Node fastCrd322 = null;  
        Node fastCrd323 = null;  
        Node fastCrd324 = null;  
        Node fastCrd325 = null;  
        Node fastCrd326 = null;  
        Node fastCrd327 = null;  
        Node fastCrd328 = null;  
        Node fastCrd329 = null;  
        Node fastCrd330 = null;  
        Node fastCrd331 = null;  
        Node fastCrd332 = null;  
        Node fastCrd333 = null;  
        Node fastCrd334 = null;  
        Node fastCrd335 = null;  
        Node fastCrd336 = null;  
        Node fastCrd337 = null;  
        Node fastCrd338 = null;  
        Node fastCrd339 = null;  
        Node fastCrd340 = null;  
        Node fastCrd341 = null;  
        Node fastCrd342 = null;  
        Node fastCrd343 = null;  
        Node fastCrd344 = null;  
        Node fastCrd345 = null;  
        Node fastCrd346 = null;  
        Node fastCrd347 = null;  
        Node fastCrd348 = null;  
        Node fastCrd349 = null;  
        Node fastCrd350 = null;  
        Node fastCrd351 = null;  
        Node fastCrd352 = null;  
        Node fastCrd
```