Data Structures: Workshop 4

Q1. Convert the following binary number to hexadecimal

1100 0101 1111 0001

12 5 15 1

C 5 F 1

decimal	hexadecimal
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	**A**
11	**B**
12	**C**
13	**D**
14	**E**
15	**F**

Q2

0001 1111 0111 1010

1 F 7 A

Q3

```
node* deleteCell(node* header, int val)
{
        boolean found = false;
        node *current = header;
        node*previous = NULL;

        while (!found && current!= NULL)
        {
              if (current->data == val){
                    found = true;
              }
              else{
                          previous = current;
                          current = current->next;
           }
}

        previous->next = current->next;
        current = NULL;
        return header;
}
```

1. **Empty Chain**
   header = NULL;
   current = NULL;

Runtime error: as current is NULL

Q3

```
node* deleteCell(node* header, int val)
{
        boolean found = false;
        node *current = header;
        node*previous = NULL;

        while (!found && current!= NULL)
        {
              if (current->data == val){
                    found = true;
              }
              else{
                    previous = current;
                    current = current->next;
             }
         }

        previous->next = current->next;
        current = NULL;
        return header;
}
```

2. List has only one node, value present

previous is not set

val = 12;

header, current

Runtime error: as previous is NULL

Q3

```
node* deleteCell(node* header, int val)
{
        boolean found = false;
        node *current = header;
        node *previous = NULL;

        while (!found && current!= NULL)
        {
              if (current->data == val){
                    found = true;
              }
              else{
                    previous = current;
                    current = current->next;
            }
         }

        previous->next = current->next;
        current = NULL;
        return header;
}
```

3. Value not present

Runtime error: as current is set to NULL at the end of the while loop

4. Work through an example for each boundary condition …..

- **empty chain**
  (fails at previous -> next = current -> next)
- **List has only one node, value present**
  (fails at previous -> next = current -> next)
- **value not present**
  (fails at previous -> next = current -> next)

```
node* deleteCell(node* header, int val)
{
        boolean found = false;
        node *current = header;
        node *previous = NULL;

        if (header == NULL) return NULL;

        if (header->next == NULL && header->data == val)) return NULL;

        // general case
        while (!found && current!=null) {
                if (current->data == val)
                        found = true;
                else{
                        previous = current;
                        current = current->next;
                 }
        }

        if (found){
                if (current == header){
                        return header -> next;
                else{
                        previous->next = current->next;
                        current = NULL;
                }
        }

        return header;
}
```

1. Empty chain

2. List has one node, value presents

3. Only remove a node if value presents