Experiment 7.3 Account Transfer System with Balance Validation in Node.js

Aim: To implement an account transfer system in Node.js that validates user balance before processing fund transfers.

Theory:

1. Account transfer systems require validation to ensure users cannot transfer more money than available in their balance.
2. Node.js with Express.js provides a robust platform for building RESTful APIs for banking and financial applications.
3. Validation middleware can be used to verify request data, such as account IDs, amounts, and authentication tokens.
4. Error handling is crucial to prevent inconsistent states during fund transfers or invalid transactions.
5. Using JSON data structures helps simulate database behavior in simple systems or experiments.
6. Implementing clear success and failure responses aids in understanding transaction flow and debugging.

Code Implementation:

```
const express=require('express');
const bodyParser=require('body-parser');

const app=express();
app.use(bodyParser.json());

let accounts=[
  {id:1,name:'Alice',balance:5000},
  {id:2,name:'Bob',balance:3000},
  {id:3,name:'Charlie',balance:7000}
];

function validateTransfer(req,res,next){
  const {from,to,amount}=req.body;
  const sender=accounts.find(a=>a.id===from);
  const receiver=accounts.find(a=>a.id===to);
  if(!sender||!receiver) return res.status(404).json({error:'Invalid account ID'});
  if(from===to) return res.status(400).json({error:'Cannot transfer to same account'});
  const amt=Number(amount);
  if(isNaN(amt)||amt<=0) return res.status(400).json({error:'Invalid amount'});
  if(sender.balance<amt) return res.status(400).json({error:'Insufficient balance'});
  req.transfer={sender,receiver,amt};
  next();
}

app.get('/accounts',(req,res)=>res.json(accounts));

app.post('/transfer',validateTransfer,(req,res)=>{
  const {sender,receiver,amt}=req.transfer;
  sender.balance-=amt;
  receiver.balance+=amt;
  res.json({message:'Transfer successful',from:sender.name,to:receiver.name,amount:amt});
});

app.listen(3002,()=>console.log('Server running on port 3002'));
```