

**1) Write an NFT Market Place Smart Contract which allows users to buy the NFT and list their already-minted NFT also the owner of the marketplace has to get a commission whenever an NFT is sold.**

**ANS.** Creating an NFT marketplace smart contract involves writing a contract that allows users to list, buy, and sell NFTs. Additionally, the marketplace owner should receive a commission from each sale. Below is a basic implementation using Solidity, a popular programming language for Ethereum smart contracts.

This example includes functionalities for:

- Listing NFTs for sale.
- Buying NFTs.
- Transferring ownership (List their already-minted NFT)
- Paying the marketplace owner a commission (Commission to owner whenever an NFT is sold)

We'll use OpenZeppelin's ERC721 implementation for the NFTs to ensure compliance with the ERC721 standard. So, firstly we have to import openZeppelin's solidity file.

---

```
// SPDX-License-Identifier: MIT
```

```
pragma solidity ^0.8.0;
```

```
import "@openzeppelin/contracts/token/ERC721/IERC721.sol";
```

```
import "@openzeppelin/contracts/access/Ownable.sol";
```

```
contract NFTMarketplace is Ownable {
```

```
    struct Listing {
```

```
        address seller;
```

```
        uint256 price;
```

```
    }
```

```
    // Mapping from token ID to listing
```

```
mapping(address => mapping(uint256 => Listing)) public listings;
```

```
// Marketplace commission in percentage (e.g., 2 for 2%)
```

```
uint256 public commissionPercentage;
```

```
address public commissionRecipient;
```

```
event NFTListed(address indexed nftContract, uint256 indexed tokenId, address  
seller, uint256 price);
```

```
event NFTBought(address indexed nftContract, uint256 indexed tokenId, address  
buyer, address seller, uint256 price);
```

```
constructor(uint256 _commissionPercentage, address _commissionRecipient) {  
    require(_commissionRecipient != address(0), "Invalid commission recipient");  
    commissionPercentage = _commissionPercentage;  
    commissionRecipient = _commissionRecipient;  
}
```

```
function listNFT(address nftContract, uint256 tokenId, uint256 price) external {  
    IERC721 nft = IERC721(nftContract);  
    require(nft.ownerOf(tokenId) == msg.sender, "You are not the owner of this NFT");  
    require(nft.getApproved(tokenId) == address(this) ||  
nft.isApprovedForAll(msg.sender, address(this)), "Marketplace not approved");
```

```
    listings[nftContract][tokenId] = Listing({  
        seller: msg.sender,
```

```

        price: price
    });

    emit NFTListed(nftContract, tokenId, msg.sender, price);
}

function buyNFT(address nftContract, uint256 tokenId) external payable {
    Listing memory listing = listings[nftContract][tokenId];
    require(listing.price > 0, "NFT not listed for sale");
    require(msg.value >= listing.price, "Insufficient payment");

    uint256 commission = (listing.price * commissionPercentage) / 100;
    uint256 sellerProceeds = listing.price - commission;

    // Transfer the NFT to the buyer
    IERC721(nftContract).safeTransferFrom(listing.seller, msg.sender, tokenId);

    // Pay the seller
    payable(listing.seller).transfer(sellerProceeds);

    // Pay the commission to the marketplace owner
    payable(commissionRecipient).transfer(commission);
}

```

```

        // Remove the listing

        delete listings[nftContract][tokenId];

        emit NFTBought(nftContract, tokenId, msg.sender, listing.seller, listing.price);
    }

    function updateCommission(uint256 _commissionPercentage, address
    _commissionRecipient) external onlyOwner {

        require(_commissionRecipient != address(0), "Invalid commission recipient");

        commissionPercentage = _commissionPercentage;

        commissionRecipient = _commissionRecipient;
    }

    function withdraw() external onlyOwner {

        payable(owner()).transfer(address(this).balance);
    }
}

```

Remove the Listing is OPTIONAL \*

This contract provides a basic structure for an NFT marketplace which allows users to buy the NFT and list their already-minted NFT (Transferring Ownership). Also, the owner of the marketplace has to get a commission whenever an NFT is sold.