



# Blockchain and Cryptocurrency

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# Transactions and UTXOs



# Transactions

Mark	->	Me	0.1 BTC
Hadelin	->	Me	0.3 BTC
Helen	->	Me	0.6 BTC
Susan	->	Me	0.7 BTC

# UTXOs: Unspent Transaction Output

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Mark	->	Me	0.1 BTC	} UTXOs
Hadelin	->	Me	0.3 BTC	
Helen	->	Me	0.6 BTC	
Susan	->	Me	0.7 BTC	



Example 1

Mark	->	Me	0.1 BTC
Hadelin	->	Me	0.3 BTC
Helen	->	Me	0.6 BTC
Susan	->	Me	0.7 BTC

} UTXOs

I want to Buy a bicycle for 0.5 BTC

TRANSACTION:

Input:

0.6 BTC from Helen

Mark	->	Me	0.1 BTC
Hadelin	->	Me	0.3 BTC
Helen	->	Me	0.6 BTC
Susan	->	Me	0.7 BTC

} UTXOs

I want to Buy a bicycle for 0.5 BTC

TRANSACTION:

Input:

0.6 BTC from Helen



Output:

0.5 BTC to the bike shop,

Mark	->	Me	0.1 BTC
Hadelin	->	Me	0.3 BTC
Helen	->	Me	0.6 BTC
Susan	->	Me	0.7 BTC

} UTXOs

I want to Buy a bicycle for 0.5 BTC

TRANSACTION:

Input:

0.6 BTC from Helen

}

Output:

0.5 BTC to the bike shop,  
0.1 BTC back to myself



Mark	->	Me	0.1 BTC	} UTXOs
Hadelin	->	Me	0.3 BTC	
<del>Helen</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.6 BTC</del>	
Susan	->	Me	0.7 BTC	

I want to Buy a bicycle for 0.5 BTC

TRANSACTION:

Input:

0.6 BTC from Helen



Output:

0.5 BTC to the bike shop,  
0.1 BTC back to myself

# Transactions and UTXOs



Mark	->	Me	0.1 BTC
Hadelin	->	Me	0.3 BTC
<del>Helen</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.6 BTC</del>
Susan	->	Me	0.7 BTC

} UTXOs

I want to Buy a bicycle for 0.5 BTC

TRANSACTION:

Input:

0.6 BTC from Helen

}

Output:

0.5 BTC to the bike shop,  
0.1 BTC back to myself

UTXO  
For the bike shop

UTXO  
For me

# Transactions and UTXOs



Mark	->	Me	0.1 BTC
Hadelin	->	Me	0.3 BTC
Susan	->	Me	0.7 BTC
Me	->	Me	0.1 BTC

UTXOs





Example 2:



# Transactions and UTXOs



Mark	->	Me	0.1 BTC	} UTXOs
Hadelin	->	Me	0.3 BTC	
Susan	->	Me	0.7 BTC	
Me	->	Me	0.1 BTC	

I want to Buy a 2<sup>nd</sup> bicycle for 1.1 BTC

# Transactions and UTXOs



Mark	->	Me	0.1 BTC	} UTXOs
<del>Hadelin</del>	<del>&gt;</del>	<del>Me</del>	<del>0.3 BTC</del>	
<del>Susan</del>	<del>&gt;</del>	<del>Me</del>	<del>0.7 BTC</del>	
<del>Me</del>	<del>&gt;</del>	<del>Me</del>	<del>0.1 BTC</del>	

I want to Buy a 2<sup>nd</sup> bicycle for 1.1 BTC

TRANSACTION:

Input:

0.3 BTC from Hadelin,  
0.7 BTC from Susan,  
0.1 BTC from Me



Output:

1.1 BTC to the bike shop,

UTXO  
For the bike shop



# Transactions and UTXOs

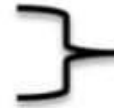
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Mark

->


Me

0.1 BTC



UTXOs





Where do  
transaction fees  
come from?



# Where do transaction fees come from?



Mark	->	Me	0.1 BTC	} UTXOs
Sarah	->	Me	0.1 BTC	
Hadelin	->	Me	0.4 BTC	
Ebay	->	Me	0.3 BTC	
Hadelin	->	Me	0.3 BTC	

I want to Buy a 3<sup>rd</sup> bicycle for 0.9 BTC and an apple for 0.02 BTC

# Where do transaction fees come from?



Mark	->	Me	0.1 BTC	} UTXOs
Sarah	->	Me	0.1 BTC	
<del>Hadelin</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.4 BTC</del>	
<del>Ebay</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.3 BTC</del>	
<del>Hadelin</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.3 BTC</del>	

I want to Buy a 3<sup>rd</sup> bicycle for 0.9 BTC and an apple for 0.02 BTC

## TRANSACTION:

### Input:

0.4 BTC from Hadelin,  
0.3 BTC from Ebay  
0.3 BTC from Hadelin

### Output:

0.9 BTC to the bike shop,  
0.02 BTC to the fruit shop,  
0.06 BTC to myself

UTXO for the bike shop

UTXO for the bike shop

UTXO for me

# Where do transaction fees come from?



Mark	->	Me	0.1 BTC	} UTXOs
Sarah	->	Me	0.1 BTC	
<del>Hadelin</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.4 BTC</del>	
<del>Ebay</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.3 BTC</del>	
<del>Hadelin</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.3 BTC</del>	

I want to Buy a 3<sup>rd</sup> bicycle for 0.9 BTC and an apple for 0.02 BTC

## TRANSACTION:

### Input:

0.4 BTC from Hadelin,  
0.3 BTC from Ebay  
0.3 BTC from Hadelin

### Output:

0.9 BTC to the bike shop,  
0.02 BTC to the fruit shop,  
0.06 BTC to myself

Fees: 0.02 BTC

UTXO for the bike shop

UTXO for the bike shop

UTXO for me



# UTXO of miner

## Where do transaction fees come from?

Mark	->	Me	0.1 BTC
Sarah	->	Me	0.1 BTC
<del>Hadelin</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.4 BTC</del>
<del>Ebay</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.3 BTC</del>
<del>Hadelin</del>	<del>-&gt;</del>	<del>Me</del>	<del>0.3 BTC</del>

} UTXOs



I want to Buy a 3<sup>rd</sup> bicycle for 0.9 BTC and an apple for 0.02 BTC

### TRANSACTION:

#### Input:

0.4 BTC from Hadelin,  
0.3 BTC from Ebay  
0.3 BTC from Hadelin



#### Output:

0.9 BTC to the bike shop,  
0.02 BTC to the fruit shop,  
0.06 BTC to myself

UTXO for the bike shop

UTXO for the bike shop

UTXO for me

Fees: 0.02 BTC ← UTXO for the miner





# Where do transaction fees come from?

Mark	->	Me	0.1 BTC	} UTXOs
Sarah	->	Me	0.1 BTC	
Me	->	Me	0.06 BTC	



# Acknowledgement and Source:

- <https://www.udemy.com/course/build-your-blockchain-az/>