

CHAPTER 9

AUCTIONS

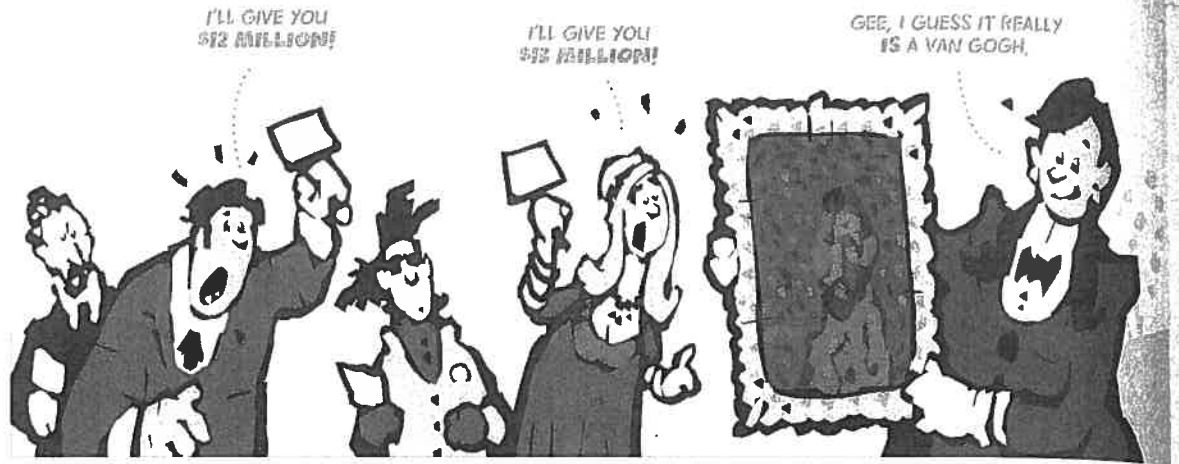
WHAT THE HECK
IS THIS THING?



I DUNNO,
I BOUGHT IT
ON EBAY.



FOR PEOPLE ENGAGED IN **TRADE**, AUCTIONS ARE USEFUL BECAUSE THEY CAN HELP **REVEAL HOW MUCH SOMETHING IS WORTH...**



... AND BECAUSE THEY CAN **PREVENT CORRUPTION...**



... AND BECAUSE THEY CAN BE USED TO **SELL STUFF FAST.**



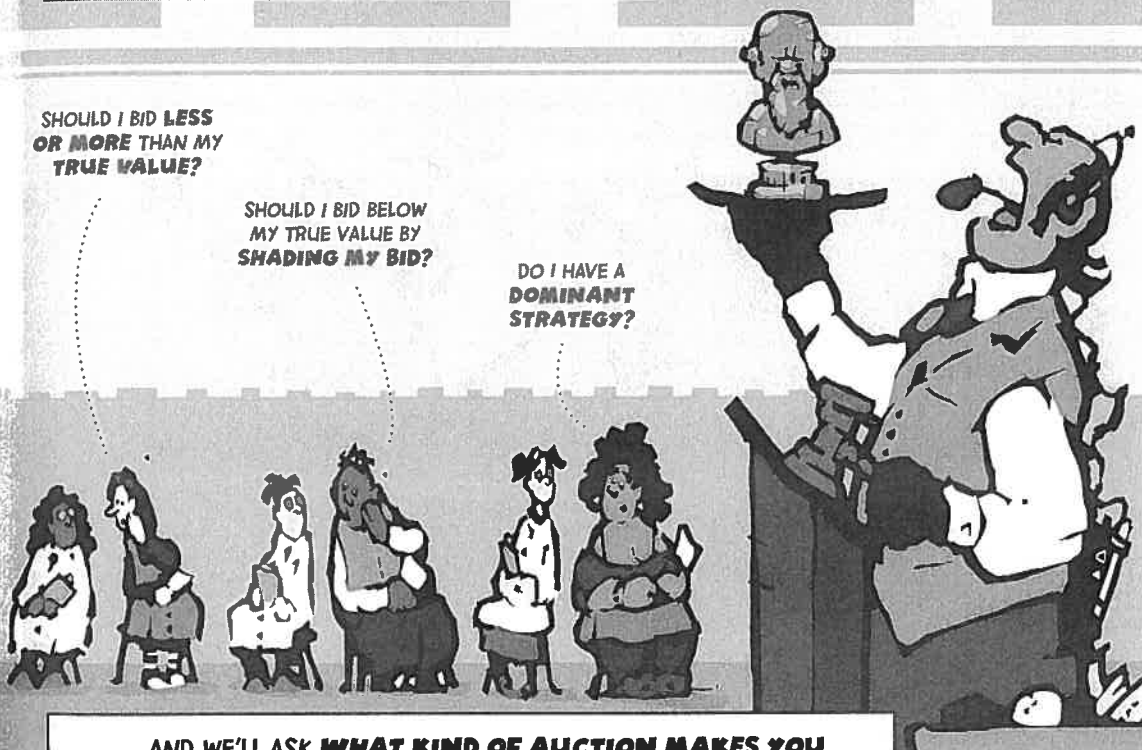
WE'RE GOING TO PUT TOGETHER WHAT WE'VE LEARNED ABOUT GAME THEORY TO **STUDY HOW AUCTIONS WORK.**

IN PARTICULAR, WE'RE GOING TO LOOK AT THE **STRATEGIES** THAT BIDDERS USE...

SHOULD I BID LESS OR MORE THAN MY TRUE VALUE?

SHOULD I BID BELOW MY TRUE VALUE BY **SHADING MY BID?**

DO I HAVE A **DOMINANT STRATEGY?**



... AND WE'LL ASK **WHAT KIND OF AUCTION MAKES YOU THE MOST MONEY** IF YOU HAVE SOMETHING TO TRADE.

YOU MEAN THERE ARE **DIFFERENT KINDS OF AUCTIONS!?**



THERE ARE 4 BASIC TYPES OF AUCTIONS:

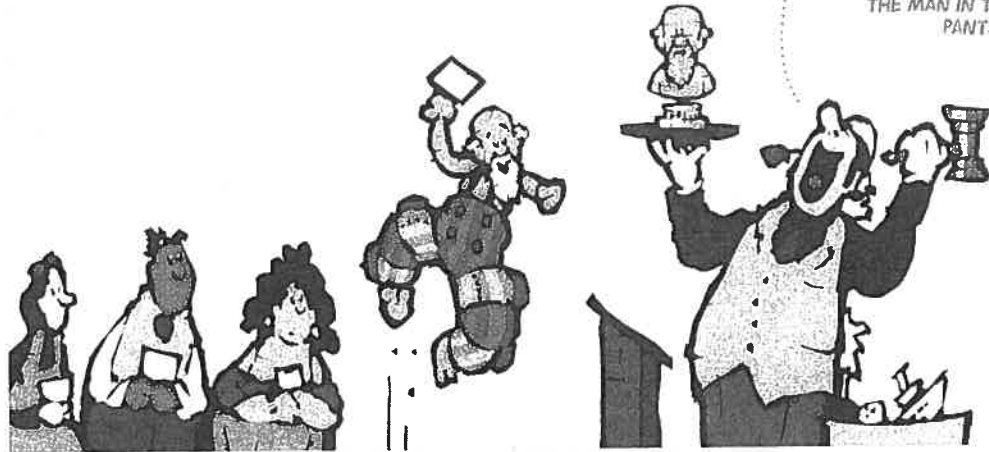


AN ASCENDING AUCTION
STARTS WITH A LOW PRICE AND THEN BIDS GO
UP UNTIL NOBODY WANTS TO BID ANY MORE.

GOING ONCE...

... GOING TWICE...

... SOLD FOR \$2,000 TO
THE MAN IN THE FUNNY
PANTS!



**SILENT AUCTIONS AT
CHARITY EVENTS ARE
ASCENDING AUCTIONS...**

... AND SO ARE
**AUCTIONS
ON EBAY.**



A DESCENDING AUCTION
STARTS WITH A **HIGH** PRICE AND GOES **DOWN**.

WE'LL START AT \$1,000, AND EACH SECOND
I'LL CUT THE PRICE BY \$50.

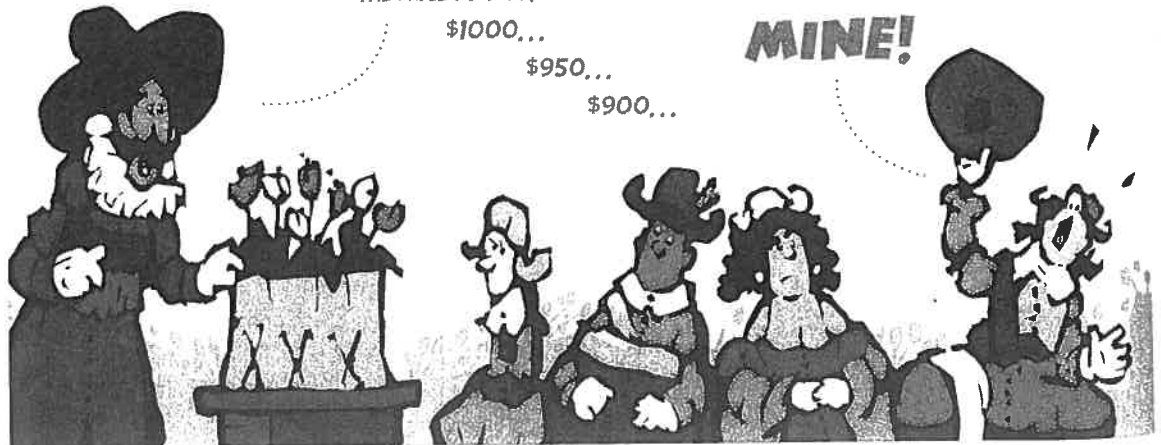
THE FIRST PERSON TO SAY
"MINE" WINS, AND THAT'S
THE PRICE YOU PAY!

\$1000...

\$950...

\$900...

MINE!



THE REMAINING TYPES ARE CALLED **SEALED-BID AUCTIONS** BECAUSE BIDDERS SUBMIT BIDS IN SEALED ENVELOPES.



IN A 1ST-PRICE SEALED-BID AUCTION
THE HIGHEST BIDDER WINS AND PAYS THE AMOUNT THAT THEY BID.



AND THE WINNER IS JENNY, WHO WINS THESE FARM TOOLS...

... AND PAYS THE AMOUNT SHE BID, \$100



IN A 2ND-PRICE SEALED-BID AUCTION
THE HIGHEST BIDDER WINS BUT ONLY PAYS THE SECOND-HIGHEST BID.



BILLY WINS THIS AUTOGRAPHED BASEBALL...

... BUT ONLY PAYS THE 2ND-HIGHEST BID, WHICH WAS EMILY'S BID OF \$85.

WAIT A MINUTE.

IF I'M SELLING SOMETHING, WHY WOULD I TAKE THE 2ND-HIGHEST PRICE WHEN I COULD GET THE 1ST-HIGHEST PRICE?

THE ANSWER TO THAT QUESTION HAS TO DO WITH STRATEGY...



BIDDERS USE DIFFERENT STRATEGIES IN DIFFERENT KINDS OF AUCTIONS!

THIS WAS ONE OF THE INSIGHTS OF **WILLIAM VICKREY**, WHO SHARED THE NOBEL PRIZE IN 1996.

I WONDER HOW MUCH I COULD AUCTION THIS OFF FOR?

CONGRATULATIONS, YOU WIN THE NOBEL PRIZE!



THE TWO MOST COMMON STRATEGIES IN SEALED-BID AUCTIONS ARE ...

... TO BID YOUR **TRUE VALUE**, WHICH MEANS BIDDING THE **MAXIMUM** YOU ARE WILLING TO PAY!

I WOULDN'T PAY ANYTHING MORE THAN \$100 FOR THOSE FARM TOOLS.

BUT I'D TAKE THEM FOR ANYTHING LESS THAN \$100.

AT EXACTLY \$100 I'M **INDIFFERENT!**



... OR TO **SHADE YOUR BID**, WHICH MEANS BIDDING **LESS** THAN YOUR TRUE VALUE!

MY TRUE VALUE IS \$100 BUT I'M GOING TO BID \$75.

THEN IF I WIN I'LL GET A **STEAL OF A DEAL!**





IT TURNS OUT THAT THE BEST APPROACH IN A 1ST-PRICE SEALED-BID AUCTION IS TO SHADE YOUR BID.

SINCE YOU'RE **INDIFFERENT** BETWEEN THE FARM TOOLS AND \$100, BIDDING \$100 MAKES NO SENSE,

YOU HAVE TO SHADE YOUR BID IF YOU WANT TO HAVE A CHANCE OF **COMING OUT AHEAD!**

BUT DON'T SHADE YOUR BID **TOO MUCH** BECAUSE YOU'LL RUIN YOUR CHANCE OF WINNING THE AUCTION!

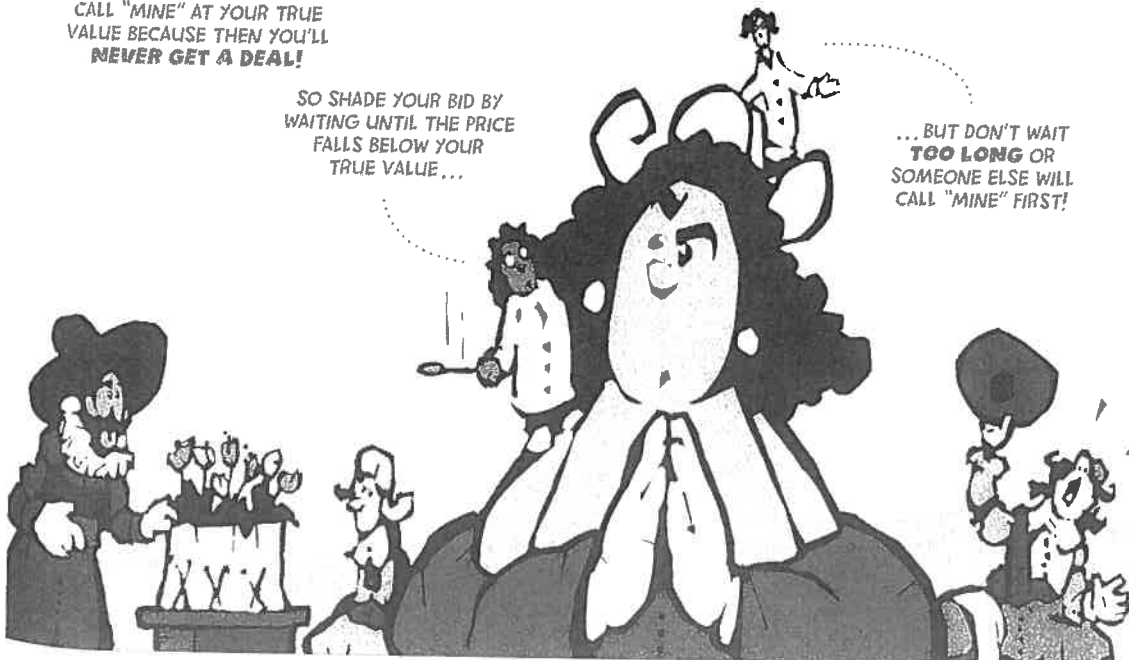


SHADING YOUR BID IS ALSO THE BEST APPROACH IN A DESCENDING AUCTION.

YOU DEFINITELY SHOULDN'T CALL "MINE" AT YOUR TRUE VALUE BECAUSE THEN YOU'LL **NEVER GET A DEAL!**

SO SHADE YOUR BID BY WAITING UNTIL THE PRICE FALLS BELOW YOUR TRUE VALUE...

... BUT DON'T WAIT **TOO LONG** OR SOMEONE ELSE WILL CALL "MINE" FIRST!



IN CONTRAST, THE BEST APPROACH IN A
2ND-PRICE SEALED-BID AUCTION
 IS TO BID YOUR **TRUE VALUE**.

THERE'S **NO**
DOWNSIDE TO
 BIDDING YOUR
 MAXIMUM...

... BECAUSE IF YOU
 WIN YOU'LL ONLY PAY
 THE 2ND-HIGHEST
 PRICE ANYWAY!

THIS IS WHY A 2ND-PRICE
 AUCTION SHOULD **YIELD**
HIGHER BIDS THAN A
 1ST-PRICE AUCTION.



IN FACT, BIDDING YOUR TRUE VALUE IN A 2ND-PRICE SEALED-BID
 AUCTION IS A **DOMINANT STRATEGY**.

NO MATTER WHAT EVERYONE ELSE
 BIDS, **YOU CAN'T DO ANY**
BETTER THAN BIDDING
YOUR TRUE VALUE!



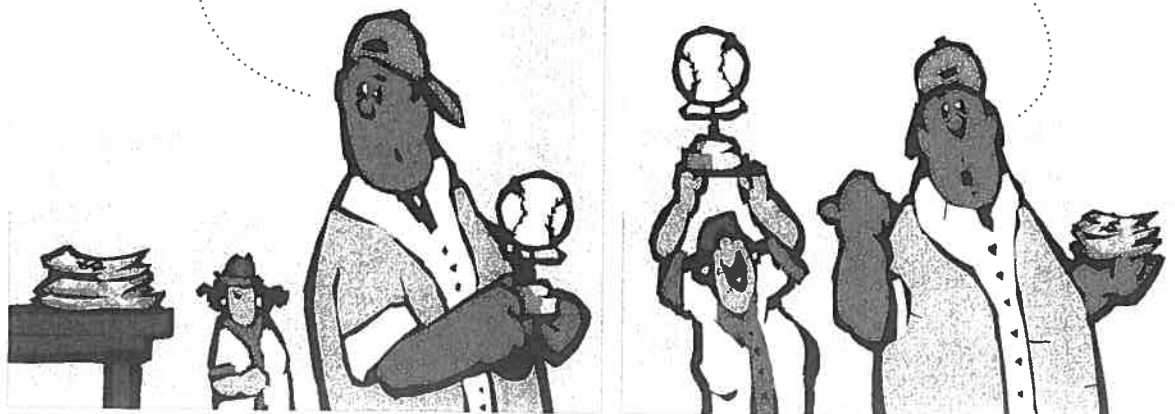
IT'S A DOMINANT STRATEGY BECAUSE YOU
 CAN'T DO BETTER IF **SOMEBODY ELSE**
BIDS MORE THAN YOUR TRUE VALUE...

... AND YOU CAN'T DO BETTER IF EVERYONE ELSE BIDS
LESS THAN YOUR TRUE VALUE.

IF MY TRUE VALUE IS \$100
 AND SOMEBODY ELSE BIDS \$120,
 I DON'T WANT TO OUTBID THEM
 BECAUSE THEN I'D BE STUCK
 PAYING **TOO MUCH!**

IF I WIN I ONLY PAY THE
 2ND-HIGHEST PRICE, SO
 SHADING MY BID CAN'T
 HELP ME...

... BUT IF MY TRUE VALUE IS
 \$100 AND I ONLY BID \$75,
 I'LL BE SORRY IF SOMEBODY
 ELSE BIDS \$85!





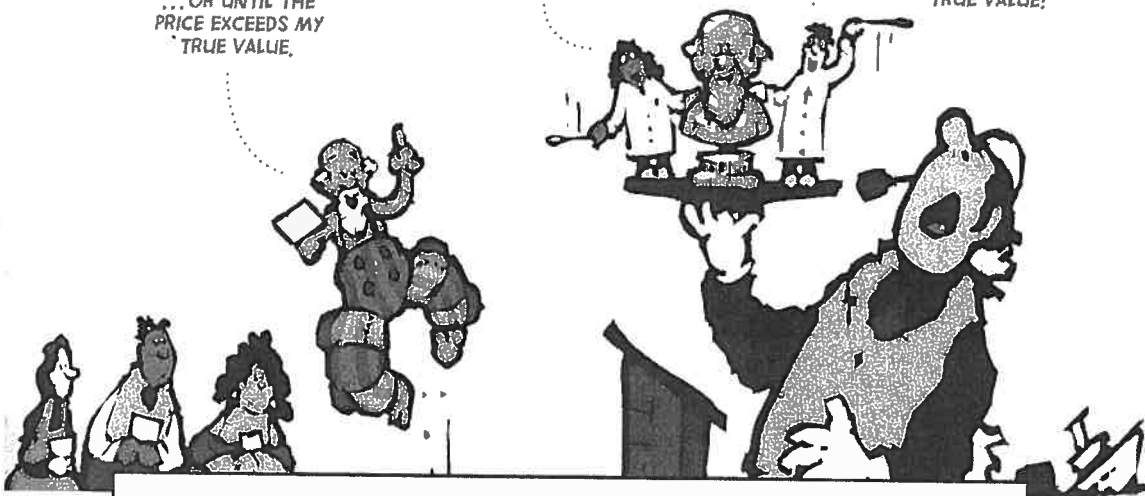
BIDDERS IN AN ASCENDING AUCTION ALSO HAVE A DOMINANT STRATEGY THAT INVOLVES THEIR TRUE VALUES.

I'M JUST GOING TO KEEP BIDDING UNTIL I WIN THAT SCULPTURE...

...OR UNTIL THE PRICE EXCEEDS MY TRUE VALUE.

HE'D BE A FOOL TO STOP BIDDING BELOW HIS TRUE VALUE!

AND HE'D BE AN EVEN BIGGER FOOL TO KEEP BIDDING PAST HIS TRUE VALUE!



SO BIDDING YOUR TRUE VALUE IS A DOMINANT STRATEGY IN BOTH 2ND-PRICE SEALED-BID AUCTIONS AND ASCENDING AUCTIONS.

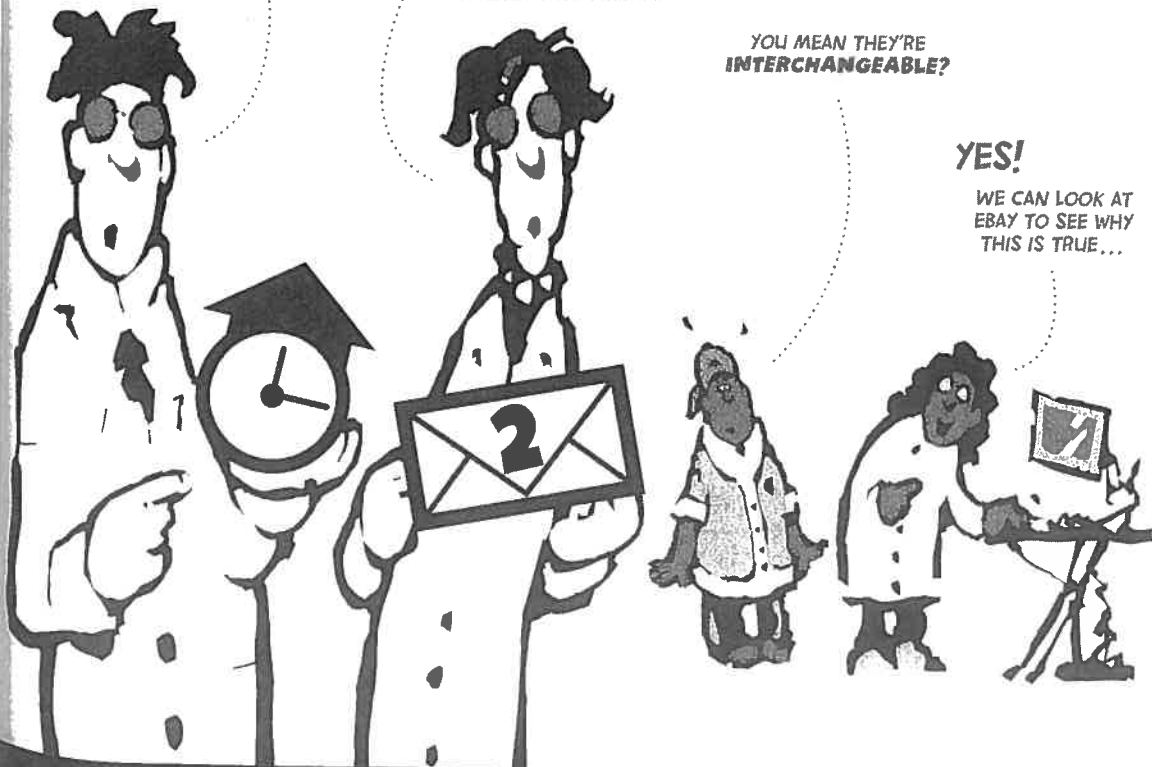
IN FACT, ALTHOUGH THEY LOOK DIFFERENT...

...THESE TWO AUCTIONS ARE BASICALLY THE SAME!

YOU MEAN THEY'RE INTERCHANGEABLE?

YES!

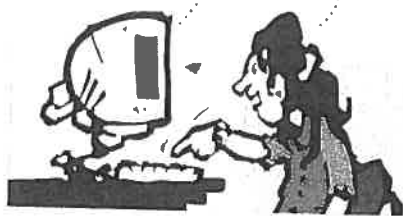
WE CAN LOOK AT EBAY TO SEE WHY THIS IS TRUE...



THE AUCTIONS ON EBAY ARE ASCENDING AUCTIONS...

THERE ARE NOW 190 MINUTES LEFT IN THE AUCTION...

\$20



\$21



\$22



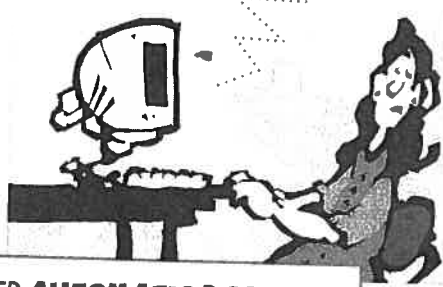
@*#%!

\$23



THERE ARE NOW 180 MINUTES LEFT IN THE AUCTION...

I DON'T HAVE TIME FOR THIS.



... BUT EBAY ALSO HAS A FEATURE CALLED AUTOMATIC BIDDING.

NO TIME?
LET ME BID
FOR YOU!

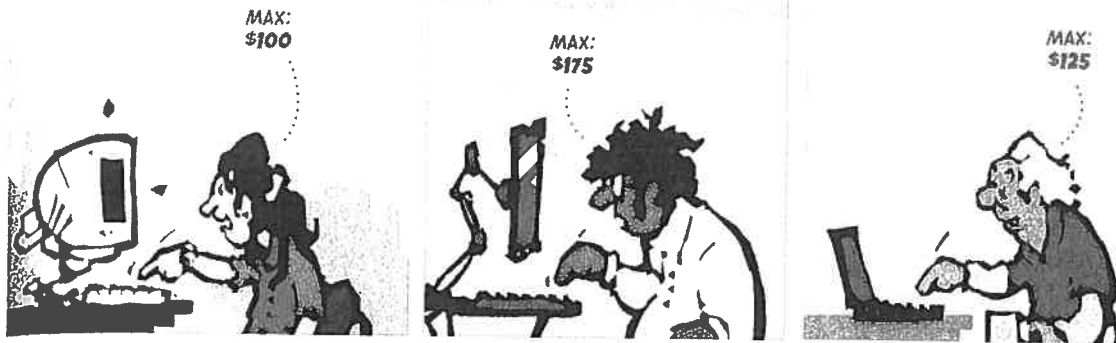
YOU TELL ME THE MAXIMUM
AMOUNT YOU'D BE WILLING
TO PAY, AND I'LL BID JUST THE
WAY YOU WOULD...

... I'LL NEVER BID MORE
THAN YOU NEED TO AND
I'LL NEVER BID MORE THAN
YOUR MAXIMUM.

AWESOME!
THIS WAY I CAN
SPEND THE NEXT 3
HOURS **STUDYING
ECONOMICS**
INSTEAD!



NOW IMAGINE WHAT HAPPENS IF **EVERYBODY** USES AUTOMATIC BIDDING.



EBAY'S COMPUTER DOES THE CALCULATIONS AND CAN EASILY PREDICT THE OUTCOME:

I'M GOING TO WIN AND PAY ABOUT \$125, BECAUSE AT THAT POINT THE 2ND-HIGHEST BIDDER WILL DROP OUT!



WITH AUTOMATIC BIDDING, EBAY HAS BASICALLY TURNED AN ASCENDING AUCTION INTO A 2ND-PRICE SEALED-BID AUCTION!

THIS IS WHY WE SAY THAT ASCENDING-PRICE AUCTIONS AND 2ND-PRICE SEALED-BID AUCTIONS ARE **STRATEGICALLY EQUIVALENT!**

BIDDING YOUR TRUE VALUE IS A **DOMINANT STRATEGY** IN BOTH AUCTIONS...

... AND THE WINNING BIDDER IN EACH AUCTION WILL PAY **ONLY THE 2ND-HIGHEST BID.**



THERE IS ALSO A **STRATEGIC EQUIVALENCE** BETWEEN DESCENDING AUCTIONS AND 1ST-PRICE SEALED-BID AUCTIONS.

TO SEE WHY, IMAGINE THAT A BIDDER IN A **DESCENDING AUCTION** HAS TO LEAVE AND GO TO THE BATHROOM.



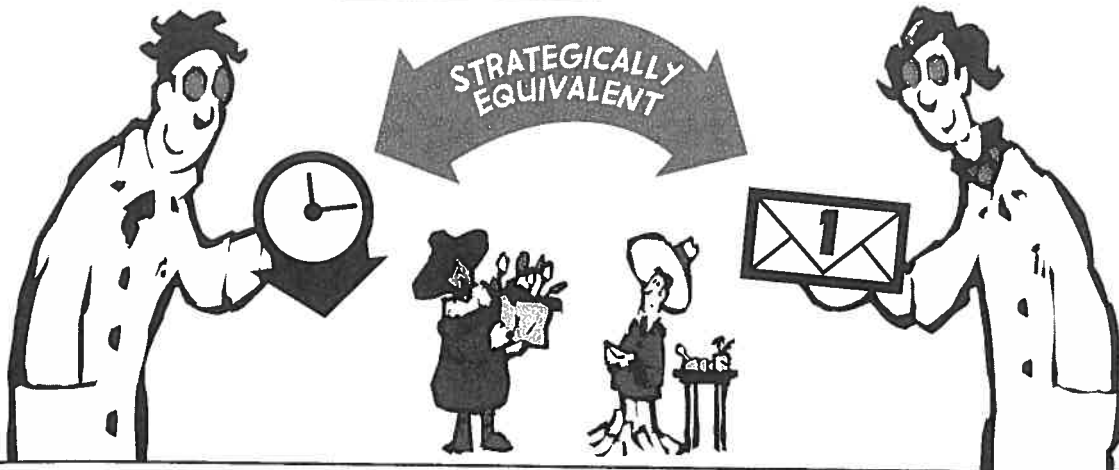
NOW IMAGINE THAT **ALL** THE BIDDERS HAVE TO LEAVE AND GO TO THE BATHROOM.



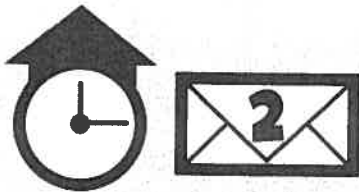
BUT IF EVERYBODY DOES THIS THEN IT'S OBVIOUS WHO'S GOING TO WIN THE AUCTION!



THIS SHOWS THAT A DESCENDING AUCTION IS STRATEGICALLY EQUIVALENT TO A 1ST-PRICE SEALED-BID AUCTION.

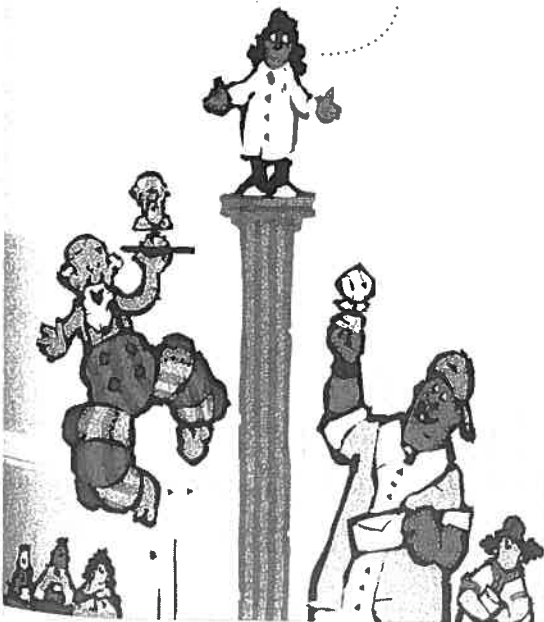


IN CONCLUSION, OUR FOUR BASIC AUCTIONS CAN BE DIVIDED INTO **TWO SETS**:



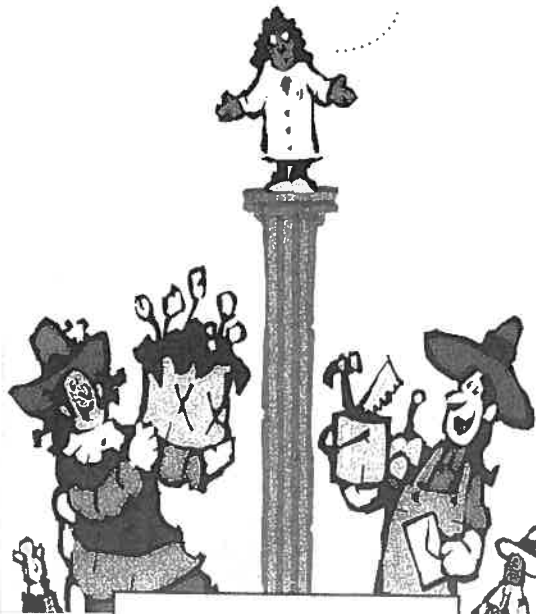
IN THESE AUCTIONS BIDDERS WILL **BID THEIR TRUE VALUES...**

... BUT THE WINNING BIDDER ONLY PAYS THE **2ND-HIGHEST BID.**



IN THESE AUCTIONS BIDDERS WILL **SHADE THEIR BIDS...**

... BUT THE WINNING BIDDER PAYS HIS OR HER **OWN BID.**



AND THAT'S NOT ALL...

THERE'S AN EVEN DEEPER RESULT THAT **CONNECTS ALL FOUR BASIC AUCTION TYPES.**

IF I WANT TO MAKE **AS MUCH MONEY AS POSSIBLE** FROM AUCTIONING THIS OFF...

... **WHICH TYPE OF AUCTION SHOULD I USE?**

IT DOESN'T MATTER!



THE REVENUE EQUIVALENCE THEOREM SAYS THAT IN MANY CIRCUMSTANCES ALL FOUR OF THESE AUCTIONS GENERATE THE SAME EXPECTED REVENUE FOR THE SELLER!

IN OTHER WORDS, THE 2ND-HIGHEST BID IN THESE TWO TYPES OF AUCTIONS...

... SHOULD EQUAL THE HIGHEST BID IN THESE TWO TYPES OF AUCTIONS!

