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[54] **COMPUTER IMPLEMENTED METHODS AND APPARATUS FOR AUCTIONS**

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[63] Continuation of application No. 08/775,880, Jan. 2, 1997, Pat. No. 5,905,975, which is a continuation-in-part of application No. 08/582,901, Jan. 4, 1996.

[60] Provisional application No. 60/009,679, Jan. 4, 1996, and provisional application No. 60/030,043, Nov. 5, 1996.

[51] Int. Cl.[7] **G06F 17/60**

[52] U.S. Cl. **705/37**; 705/26; 707/104

[58] Field of Search 705/1, 26, 27, 705/37, 44, 40, 5, 6, 7, 8, 10, 30, 35, 36; 283/56; 340/825.26, 825.27, 825.28, 825.29; 902/22, 24; 379/91, 92, 93; 707/1, 3, 4, 5, 10, 104

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,573,747	4/1971	Adams et al.	705/37
3,581,072	5/1971	Nymeyer	705/37
4,789,928	12/1988	Fujisaki	705/37
5,077,665	12/1991	Silverman et al.	705/37
5,136,501	8/1992	Silverman et al.	705/37
5,394,324	2/1995	Clearwater	705/8
5,664,115	9/1997	Fraser	705/37
5,689,652	11/1997	Lupien et al.	705/37
5,727,165	3/1998	Ordish et al.	705/37

FOREIGN PATENT DOCUMENTS

WO97/37315 10/1997 WIPO .

OTHER PUBLICATIONS

Dialog Abstract: File 610, Acc# 0489267; "ONSALE: ONSALE Brings Thrill of Auctions and Bargain Hunting Online; Unique Internet retail service debuts with week-long charity auction for The Computer Museum in Boston"; May 24, 1995.

"Onsale Joins Fray as Online Shopping Picks Up Speed: Internet Booms"; *Computer Reseller News*; p. 73; Jun. 5, 1995; Dialog: File 16, Acc# 05649796.

Siegmann; "Nowhere to Go But Up. (Onsale CEO Jerry Kaplan) (PC Week Inside) (Inside People)"; *PC Week*; v12 n42; pA5 (1); Oct. 23, 1995; Dialog: File 148, Acc# 08222496.

Bidder Information Packet for FCC auction scheduled for Dec. 11, 1995, pp. 33–36, 47, 57–59.

Bidder Information Packet for FCC auction scheduled for Aug. 2, 1995, pp. 99–104.

Joint Report on the Government Securities Market, Jan. 1992, pp. 14–16, B–20 through B–24.

ACD Market Operations Guide, Sholtz & Associates, LLC, Jan. 3, 1996, pp. 1–5.

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[57] **ABSTRACT**

A computer implemented system and method of executing an auction. The system has at least two intelligent systems, one for the auctioneer and at least one for a user. The auction is conducted by the auctioneer's system communicating with the user system(s). The auctioneer's system receives information from the user system(s) based on bid information entered by the user(s). With this information the auctioneer's system determines whether the auction can be concluded or not and appropriate messages are transmitted to the user(s).

32 Claims, 17 Drawing Sheets
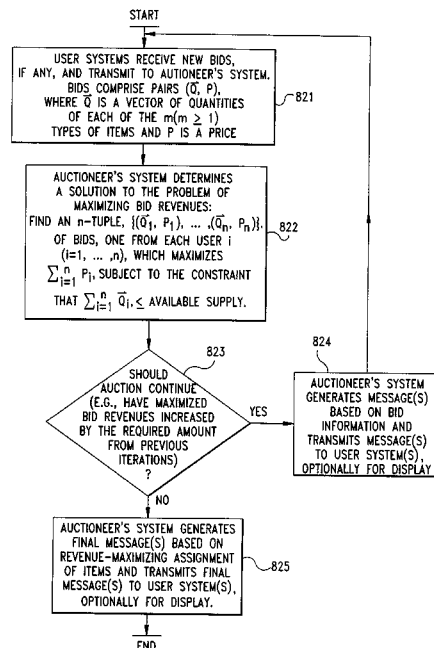
The drawings are the same as contained in "Computer Implemented Methods and Apparatus for Auctions," U.S. Patent Number 5,905,975, issued 18 May 1999.

COMPUTER IMPLEMENTED METHODS AND APPARATUS FOR AUCTIONS

RELATED APPLICATION

This application is a continuation of my prior application Ser. No. 08/775,880, filed Jan. 2, 1997, now U.S. Pat. No. 5,905,975 which application is a continuation-in-part of my prior copending application Ser. No. 08/582,901 filed Jan. 4, 1996. This application is also related to my provisional applications Ser. No. 60/009,679 filed Jan. 4, 1996 and Ser. No. 60/030,043 filed Nov. 5, 1996. The subject matter of these applications are incorporated by this reference.

FIELD OF THE INVENTION

The present invention relates to improving auctions and, more particularly, to implementing an auction, such as a flexible dynamic auction, through the use of a plurality of intelligent, i.e. CPU-based, systems.

BACKGROUND OF THE INVENTION

Auction formats in the art tend generally to be of the sealed-bid or ascending-bid variety. In the standard sealed-bid auction, bidders—in one single bidding round—simultaneously and independently submit bids to the auctioneer, who then determines the auction outcome. In the standard ascending-bid auction, bidders—in a dynamic bidding process—submit bids in real time until no more bids are forthcoming. An ascending-bid format offers the advantage that there is feedback between participants' bids: each bidder is able to infer other bidders' information about the value of the object(s) as the auction progresses and incorporate this information into his subsequent bids. This feedback tends to result in more efficient auction outcomes as well as more aggressive bidding, resulting in higher expected revenues for the seller. However, an ascending-bid format also has the disadvantage that—in complex environments—the auction may last for a long time, and require serious bidders to devote substantially all their time during this extended period of the auction. (For example, some of the ascending-bid auctions conducted by the Federal Communication Cornmission in 1994–96 have consisted of well over 100 bidding rounds and lasted upwards of three months each. In particular, the D-E-F block broadband PCS auction, which began on Aug. 26, 1996, was still in progress on Dec. 20, 1996, and had already conducted 229 bidding rounds.) In addition, the real-time aspect of the bidding—which gives the standard ascending-bid auction its desirable properties—also implies that any bidder's continued participation (and thus the auction's success) may be imperiled by communication breakdowns or other lapses anytime in the course of the auction. By contrast, while a sealed-bid format does not provide participants the opportunity to respond to their competitors' bids, the auction may be completed much more quickly and requires only a single bid submission by bidders, so participation is less onerous for bidders and may be less susceptible to communication breakdowns.

SUMMARY OF THE INVENTION

The present invention, in one respect, is a computerized system which allows flexible bidding by participants in a dynamic auction, combining some of the advantageous facets of the sealed-bid format with the basic advantages of an ascending-bid format. At any point in the auction, bidders are provided the opportunity to submit not only their current

bids, but also to enter future bids (to be more precise, bidding rules which may have the opportunity to become relevant at future times or prices), into the auction system's database. Moreover, participants are continually provided the opportunity to revise their bids associated with all future times or prices which have not already been reached, by entering new bids which have the effect of superseding this bidder's bids currently residing in the auction system's database. Thus, at one extreme, a bidder who wishes to economize on his time may choose to enter his entire set of bidding rules into the computerized system at the start of the auction, effectively treating this as a sealed-bid auction. At the oppQsite extreme, a bidder who wishes to closely participate in the auction may choose to constantly monitor the auction's progress and to submit all of his bids in real time. Most bidders are likely to select an approach somewhere between these extremes: a bidder may enter a preliminary set of bidding rules at the start of the auction, but then periodically choose to revise his bidding rules as information is generated through the auction process. He can avoid the necessity of spending every minute of his time monitoring the auction, but still avail himself of the opportunity to respond to his competitors' bids. By the same token, the auctioneer can run the auction at a faster pace and using smaller bid increments with the present invention than with a system only permitting contemporaneous bids; no bidder need risk missing a submission deadline and completely losing out on placing desired bids (or being disqualified from the auction), as his bidding rules residing in the auction system database fill in until the bidder chooses to revise them.

In order to obtain the advantages of the invention, each of the bidders uses a dedicated user system and the auction itself is monitored and controlled via an auctioneer's system. The auctioneer's system can communicate messages to each of the user systems. The messages are used to initiate an auction and the message initiating an auction may carry with it information describing the particular auction being initiated. The users may thereafter enter flexible bid information which can include a scalar-value, vector-value or a function. The flexible bid information may be an expression of how many units of object(s) a bidder is willing to purchase at a given price(s), how much money a bidder is willing to pay for the purchase of a given object(s), or any other expression of the willingness-to-pay or value which a bidder places on object(s). Optionally, a bidding rule may also include a limitation (e.g. "I desire up to a quantity of x at a price P, but I do not want any positive quantity at all unless I receive a minimum quantity of y"). Thus, a bidding rule may include an unconditional bid or a contingent bid, and may consist of a function from available information to bid quantities (e.g. a function of the previous bid(s) submitted).

The flexible bid information, once input via a user system, is stored in one or more databases, each of which is accessible to the auctioneer's system.

The auction itself includes a number of queries and answers, queries from the auctioneer's system to the database, and answers to the queries from the database. The auctioneer's system is capable of making a decision based on the answers from the database for determining whether an auction should continue. If a decision is reached indicating that the auction should continue, at least one message is generated and communicated to a user system carrying that information. If a decision is reached to terminate or not to continue the auction, then a final message is generated to at least one user system. The final message may include the results of the auction.

The rest of the disclosure is the same as contained in "Computer Implemented Methods and Apparatus for Auctions," U.S. Patent Number 5,905,975, issued 18 May 1999.

TABLE 3B-continued

Auction	Description of Auction	Does Named Bidder Win?
III	Bidder 3's Auction for {B}	Bidder 3 Wins
—	Bidder 3's Auction for Ø	Bidder 3 Wins
IV	Bidder "12" Auction for {A, B}	Bidder "12" Loses
V	Bidder "12" Auction for {A}	Bidder "12" Wins
VI	Bidder "12" Auction for {B}	Bidder "12" Loses
—	Bidder "12" Auction for Ø	Bidder "12" Wins

TABLE 4

VALUES:

$V(1, 1) = 200$ $V(1, 2) = 30$ $V(1, 3) = 230$
$V(2, 1) = 40$ $V(2, 2) = 40$ $V(2, 3) = 50$
$V(3, 1) = 25$ $V(3, 2) = 75$ $V(3, 3) = 125$

INITIAL BIDS:

$BID(1, 1) = 40$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 0$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 30$
REVENUES FROM INITIAL BIDS ARE: 70
ROUND 1

BIDDER 1 ENTERS NO NEW BID
BIDDER 2 BIDS A PRICE OF 31 ON SET {B}
BIDDER 3 BIDS A PRICE OF 71 ON SET {A, B}
$BID(1, 1) = 40$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 31$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 71$
REVENUES ARE: 71
ROUND 2

BIDDER 1 ENTERS NO NEW BID
BIDDER 2 ENTERS NO NEW BID
BIDDER 3 BIDS A PRICE OF 72 ON SET {A, B}
$BID(1, 1) = 40$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 31$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 72$
REVENUES ARE: 72
ROUND 3

BIDDER 1 BIDS A PRICE OF 42 ON SET {A}
BIDDER 2 BIDS A PRICE OF 33 ON SET {B}
BIDDER 3 ENTERS NO NEW BID
$BID(1, 1) = 42$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 33$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 72$
REVENUES ARE: 75
ROUND 4

BIDDER 1 ENTERS NO NEW BID
BIDDER 2 ENTERS NO NEW BID
BIDDER 3 BIDS A PRICE OF 76 ON SET {A, B}
$BID(1, 1) = 42$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 33$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 76$
REVENUES ARE: 76
ROUND 5

BIDDER 1 BIDS A PRICE OF 44 ON SET {A}
BIDDER 2 BIDS A PRICE OF 35 ON SET {B}
BIDDER 3 ENTERS NO NEW BID
$BID(1, 1) = 44$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 35$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 76$
REVENUES ARE: 79
ROUND 6

BIDDER 1 ENTERS NO NEW BID
BIDDER 2 ENTERS NO NEW BID

TABLE 4-continued

BIDDER 3 BIDS A PRICE OF 80 ON SET {A, B}
$BID(1, 1) = 44$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 35$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 80$
REVENUES ARE: 80
ROUND 7

BIDDER 1 BIDS A PRICE OF 46 ON SET {A}
BIDDER 2 BIDS A PRICE OF 37 ON SET {B}
BIDDER 3 ENTERS NO NEW BID
$BID(1, 1) = 46$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 37$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 80$
REVENUES ARE: 83
ROUND 8

BIDDER 1 ENTERS NO NEW BID
BIDDER 2 ENTERS NO NEW BID
BIDDER 3 BIDS A PRICE OF 84 ON SET {A, B}
$BID(1, 1) = 46$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 37$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 84$
REVENUES ARE: 84
ROUND 9

BIDDER 1 BIDS A PRICE OF 48 ON SET {A}
BIDDER 2 BIDS A PRICE OF 39 ON SET {B}
BIDDER 3 ENTERS NO NEW BID
$BID(1, 1) = 48$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 39$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 84$
REVENUES ARE: 87
ROUND 10

BIDDER 1 ENTERS NO NEW BID
BIDDER 2 ENTERS NO NEW BID
BIDDER 3 BIDS A PRICE OF 88 ON SET {A, B}
$BID(1, 1) = 48$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 39$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 88$
REVENUES ARE: 88
ROUND 11

BIDDER 1 BIDS A PRICE OF 50 ON SET {A}
BIDDER 2 ENTERS NO NEW BID
BIDDER 3 ENTERS NO NEW BID
$BID(1, 1) = 50$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 39$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 30$ $BID(3, 3) = 88$
REVENUES ARE: 89
ROUND 12

BIDDER 1 ENTERS NO NEW BID
BIDDER 2 ENTERS NO NEW BID
BIDDER 3 BIDS A PRICE OF 40 ON SET {B}
$BID(1, 1) = 50$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 39$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 40$ $BID(3, 3) = 88$
REVENUES ARE: 90
ROUND 13

BIDDER 1 ENTERS NO NEW BID
BIDDER 2 ENTERS NO NEW BID
BIDDER 3 ENTERS NO NEW BID
$BID(1, 1) = 50$ $BID(1, 2) = 0$ $BID(1, 3) = 40$
$BID(2, 1) = 0$ $BID(2, 2) = 39$ $BID(2, 3) = 0$
$BID(3, 1) = 0$ $BID(3, 2) = 40$ $BID(3, 3) = 86$
REVENUES ARE: 90
AUCTION OUTCOME:

BIDDER 1 HAS WON SET {A} FOR A PRICE OF 50
BIDDER 3 HAS WON SET {B} FOR A PRICE OF 40

I claim:

1. A dynamic computer implemented auction system for multiple dissimilar objects operating in multiple rounds comprising:

a) an auctioneer's system and at least two user systems, the auctioneer's system communicatively coupled to user systems;

b) each user system including:

b1) means for receiving messages from the auctioneer's system and for displaying those messages;

b2) means for receiving bid related information from a user and for transmitting bid information to the auctioneer's system, where said bid information includes a value parameter P_i and an associated object subset identification S_i, where the object subset identification S_i identifies a set of objects and where the value parameter P_i specifies a payment proposed by the bidder in return for the objects of subset S_1;

c) said auctioneer's system including:

c1) means for generating and transmitting messages to user systems, said messages including a message to initiate an auction, a non-final message indicating that the auction will continue at least one more round, and a final message indicating that the auction has terminated;

c2) means for receiving bid information from user systems in multiple rounds of bidding;

c3) decision means responsive to the bid information received from the user systems for determining if an auction should continue or not, wherein the decision means includes:

c31) means to initiate the generation of a non-final message to at least one user system in response to a determination to continue the auction;

c32) means to initiate the generation of a final message to at least one user system in response to a determination not to continue the auction; and

c33) selecting means to select an n-tuple of bids (S_i, P_i), at most one from each user system, which selection is effective to optimize the sum of the different value parameters P_i of the selected bids subject to the constraint that the associated subsets S_i of all of the selected bids are compatible.

2. A system as recited in claim 1 wherein the selecting means selects bids to optimize the sum of the different value parameters P_i of the selected bids subject to the constraint that the associated subsets S_i of every pair of selected bids are disjoint.

3. The auction system of claim 2 wherein the decision means compares the sum of the parameters P_i from the selected bids to a function of the sum of the parameters P_i of an earlier round of selected bids.

4. A system as recited in claim 1 wherein the object subset identifications S_1 are vectors of quantities of each type of object and the selecting means optimizes the sum of' the different value parameters P_i of the selected bids subject to the constraint that tile sum of quantities of each type of object, from each selected bid, are less than or equal to thle quantity of each type of object within the auction.

5. The auction system of claim 4 wherein the decision means compares the sum of the parameters P_i from the selected bids to a function of the sum of the parameters P_i of an earlier round of selected bids.

6. The auction system of claim 1 wherein the set of objects includes at least one object which is related to at least one other object.

7. The auction system of claim 6 wherein the decision means compares the sum of the parameters P_i from the selected bids to a function of the sum of the parameters P_i of an earlier round of selected bids.

8. The auction system of claim 1 wherein the decision means compares the sum of the parameters P_i from the selected bids to a function of the sum of the parameters P_i of an earlier round of selected bids.

9. A dynamic computer implemented auction system for auctions for plural objects operating in multiple rounds at changing prices, said auction system comprising:

a) an auctioneer's system and at least two user systems, the auctioneers system communicatively coupled to user systems;

b) each user system including:

b1) means for receiving messages from the auctioneer's system and for displaying those messages;

b2) means for receiving bid related information from a user and for transmitting bid information to the auctioneer's system, where said bid informatioin specifies at least quantities of objects; and

c) said auctioneer's system including:

c1) means for generating and transmitting messages to user systems, said messages including a message to initiate an auction, a non-final message indicating that the auction will continue at least one more round, and a final message indicating that the auction has terminated, said non-final message also indicating a current quantity of objects, where the current quantity of objects may be greater than a quantity of objects in a prior round;

c2) means for receiving bid information from user systems in one or more rounds of bidding; and

c3) decision means responsive to the bid information received fiom the user systems for determining if an auction should continue or not, said decision means including:

c31) means to initiate the generation of a non-final message to at least one user system in response to a determination to continue the auction;

c32) means to initiate the generation of a final message to at least one user system in response to a determination not to continue the auction; and

c33) means for comparing a sum of quantities specified in bids in a current round with the quantity of objects specified by the auctioneer's system for a current round and termninating the auction when that comparison shows that the sum ot quantities specified in bids is equal to or less than the quantity specified by the auctioneer's s,system.

10. An auction system as recited in claim 9 wherein the plural objects include at least two different types of objects and at least two objects of each type.

11. An auction system as recited in claim 9 wherein the plural objects are multiple identical objects, at least one said message includes a current price, and a bid comprises a quantity of the objects that the bidder wishes to transact.

12. An auction system as recited in claim 9 wherein the plural objects includes at least one object which is related to at least one other object.

13. An auction system as recited in claim 9 wherein the bid information transmitted by a user system is limited to a current round bid.

14. An auction system as recited in claim 9 wherein the user system receives bid related iniform-ation only for the current round from a user and transmits bid information only for a current round bid.

15. An auction system as recited in claim 9 wherein the auctioneer system records a message specifying a quantity of objects for one or more rounds beyond a current round.

16. A method for conducting a dynamic computer implemented auction for multiple dissimilar objects operating in multiple rounds comprising:

a) providing an auctioneer's system,

b) conveying messages concerning an auction to users from the auctioneer's system, said messages including a message to initiate an auction, a non-final message indicating that the auction will continue at least one more round, and a final message indicating that the auction has terminated

c) receiving bid related information from plural users and, in response, conveying bid information from the users to the auctioneer's system, where said bid informaition includes a value parameter P_i and an associated object subset identification S_i, where the object subset identification S_i identifies a set of objects and where the value parameter P_i specifies a payment proposed by the bidder in return for the objects of subset S_i;

d) determining, in response to the bid information, if an auction should continue or not, including selecting an n-tuple of bids (S_i, P_i), at most one from each user, to optimize the sum of the different value parameters P_i of the selected bids subject to the constraint that the associated subsets S_i of all of the selected bids are compatible.

17. A method as recited in claim 16 wherein the selecting selects bids to optimize the sum of the different value parameters P_i of the selected bids subject to the constraint that the associated subsets S_i of every pair of selected bids are disjoint.

18. A method as recited in claim 17 further including comparing, the sum of the parameters P_i of the selected bids to a function of the sum of the parameters P_i of an earlier round of selected bids.

19. A method as recited in claim 16 wherein the object subset identifications S_i are vectors of quantities of each type of object and the selecting optimizes the sum ot the different value parameters P_i of the selected bids subject to the constraint that the sum ot quantities of each type of object, from each selected bid, are less than or equal to the quantity of each type of object within the auction.

20. A method as recited in claim 19 further including comparing the sum of the parameters P_i of selected bids to a function of the sum of the parameters P_i of in earlier round of selected bids.

21. A method as recited in claim 16 wherein the set of objects includes ait least one object which is related to at least one other object.

22. A method as recited in claim 21 further including comparing the sum of the parameters P_i of selected bids to a function of the sum of the parameters P_i of all earlier round of selected bids.

23. A method as recited in claim 16 further including comparing the sum of thle parameters P_i of the selected bids to a function of the sum of the parameters P_i of an earilier round of selected bids.

24. A method as recited in claim 16 further including, at a determination not to continue the auction, assigning objects identified in a selected bid to the user in return for the bid value parameter P_i.

25. A method for conducting a dynamic computer implemented auction for plural objects operating in multiple rounds at changing prices comprising:

a) providing an auctioneer's system and transmitting messages from the auctioneer's system to users, said messages including a message to initiate an auction, a non-final message indicating that the auction will continue at least one more round, and a final message indicating that the auction has terminated, said non-final message also indicating a current quantity of objects, where the current quantity of objects may be greater than a quantity of objects in a prior round;

b) receiving bid related information from users and, in response, transmitting bid information to the auctioneer's system, where said bid information specifies at least quantities of objects; and

c) determining at the auctioneer's system, in response to the bid information received from the users if an auction should continue or not, including comparing a sum of quantities specified in bids in a current round with the quantity of objects specified by the auctioneer's system for a current round and terminating the auction when that comparison shows that the sum of quantities specified in bids is equal to or less than the quantity specified by the auctioneer's system.

26. A method as recited in claim 25 wherein the plural objects include at least two different types of objects and at least two objects of each type.

27. A method as recited in claim 25 wherein the plural objects are multiple identical objects, at least one said message includes a current price, and a bid comprises a quantity of the objects that the bidder wishes to transact.

28. A method as recited in claim 27 further including assigning quantities specified in bids in a final round at a price associated with a most recent round in which the sum of quantities bid was equal to or greater than the quantity specified by the auctioneer's system.

29. A method as recited in claim 25 wherein the set of objects includes at least one object which is related to at least one other object.

30. A method as recited in claim 25 wherein the bid information is limited to a current round bid.

31. A method as recited in claim 25 wherein the user system receives bid related information only for the current round from a user and transmits bid information only for a current round bid.

32. A method as recited in claim 25 wherein the auctioneer system records a message specifying, a quantity of objects for one or more rounds beyond a current round.

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