

This ... is ... "Maximal Jeopardy!"

You are the world's greatest "Jeopardy!" player. You always respond correctly, and you always respond so quickly that your opponents never get the chance to buzz in. Now, since you're so smart, answer this question:

What is the most money you can win in "Jeopardy!"?

The rules of "Jeopardy!" are (essentially) as follows:

Round 1. Jeopardy!

Thirty items are worth the amounts shown below, EXCEPT for one hidden "Daily Double" item. A "Daily Double" doubles your current score.*

\$200	\$200	\$200	\$200	\$200	\$200
\$400	\$400	\$400	\$400	\$400	\$400
\$600	\$600	\$600	\$600	\$600	\$600
\$800	\$800	\$800	\$800	\$800	\$800
\$1000	\$1000	\$1000	\$1000	\$1000	\$1000

Round 2. Double Jeopardy!

In this round, dollar values double. So, each of thirty items is worth the amount shown below, EXCEPT in this round TWO of these items are hidden "Daily Double"s. As before, a "Daily Double" doubles your score* ... including money you won in Round 1!

\$400	\$400	\$400	\$400	\$400	\$400
\$800	\$800	\$800	\$800	\$800	\$800
\$1200	\$1200	\$1200	\$1200	\$1200	\$1200
\$1600	\$1600	\$1600	\$1600	\$1600	\$1600
\$2000	\$2000	\$2000	\$2000	\$2000	\$2000

Round 3. Final Jeopardy!

This round features a single item that gives you one more opportunity to double your current score.*

* Technically, with each Daily Double item, you "wager" some amount of money up to your current total or the amount shown on the item, whichever is greater; you win (or lose) the amount of that wager by responding correctly (or incorrectly). In an optimal strategy, your current score will exceed the amount shown on each "Daily Double" item you encounter. Since you always respond correctly, and since you're going for the maximum score, you should naturally wager as much as possible at each opportunity. (In the show, that's called a "True Daily Double".) The end result, then, is that these items serve to double your score.

Note that, in order to determine the maximum possible score, you get to say where the "Daily Double" items should go, and you get decide when to use them.

Likewise, the real Final Jeopardy! item involves a wager. Betting everything —as you should, since you're guaranteed to win— doubles your score.

This ... is ... "Maximal Jeopardy!": Solution

The key to maximizing your score is in the placement the "Daily Double" items.

The best locations are in place of a "\$100" item in Round 1, and in place of "\$200" items in Round 2. (Can you see why?)

Having placed the "Daily Double" items appropriately, you save them until after you have responded to every other item in a round. With this strategy, the scores accumulate as follows:

Round 1. Jeopardy!

\$200	\$200	\$200	\$200	\$200	* DD *
\$400	\$400	\$400	\$400	\$400	\$400
\$600	\$600	\$600	\$600	\$600	\$600
\$800	\$800	\$800	\$800	\$800	\$800
\$1000	\$1000	\$1000	\$1000	\$1000	\$1000

Answering every item before the "Daily Double" gives a score of

$$\begin{aligned} & 5 \cdot \$200 & + 6 \cdot \$400 & + 6 \cdot \$600 & + 6 \cdot \$800 & + 6 \cdot \$1000 \\ & = \$1,000 & + \$2,400 & + \$3,600 & + \$4,800 & + \$6,000 \\ & = \mathbf{\$17,800} \end{aligned}$$

The Daily Double then doubles that score to **\$35,600**. Break for commercial, then on to Round 2!

Round 2. Double Jeopardy!

\$400	\$400	\$400	\$400	* DD *	* DD *
\$800	\$800	\$800	\$800	\$800	\$800
\$1200	\$1200	\$1200	\$1200	\$1200	\$1200
\$1600	\$1600	\$1600	\$1600	\$1600	\$1600
\$2000	\$2000	\$2000	\$2000	\$2000	\$2000

Answering every item before the Daily Double gives a score of

$$\begin{aligned} & \$35,600 & + 4 \cdot \$400 & + 6 \cdot \$800 & + 6 \cdot \$1200 & + 6 \cdot \$1600 & + 6 \cdot \$2000 \\ & = \$35,600 & + \$1,600 & + \$4,800 & + \$7,200 & + \$9,600 & + \$12,000 \\ & = \mathbf{\$70,800} \end{aligned}$$

One Daily Double then doubles the score to **\$141,600**, and the other Daily Double doubles the score to **\$283,200**. Now for the final round!

Round 3. Final Jeopardy!

This round doubles your score once more, making the maximum possible score equal to

\$566,400

Historical Note: In 2004, Ken Jennings played 74 games of "Jeopardy!" and amassed \$2,520,700. (It's almost sad, considering how much he could have won in that time.)