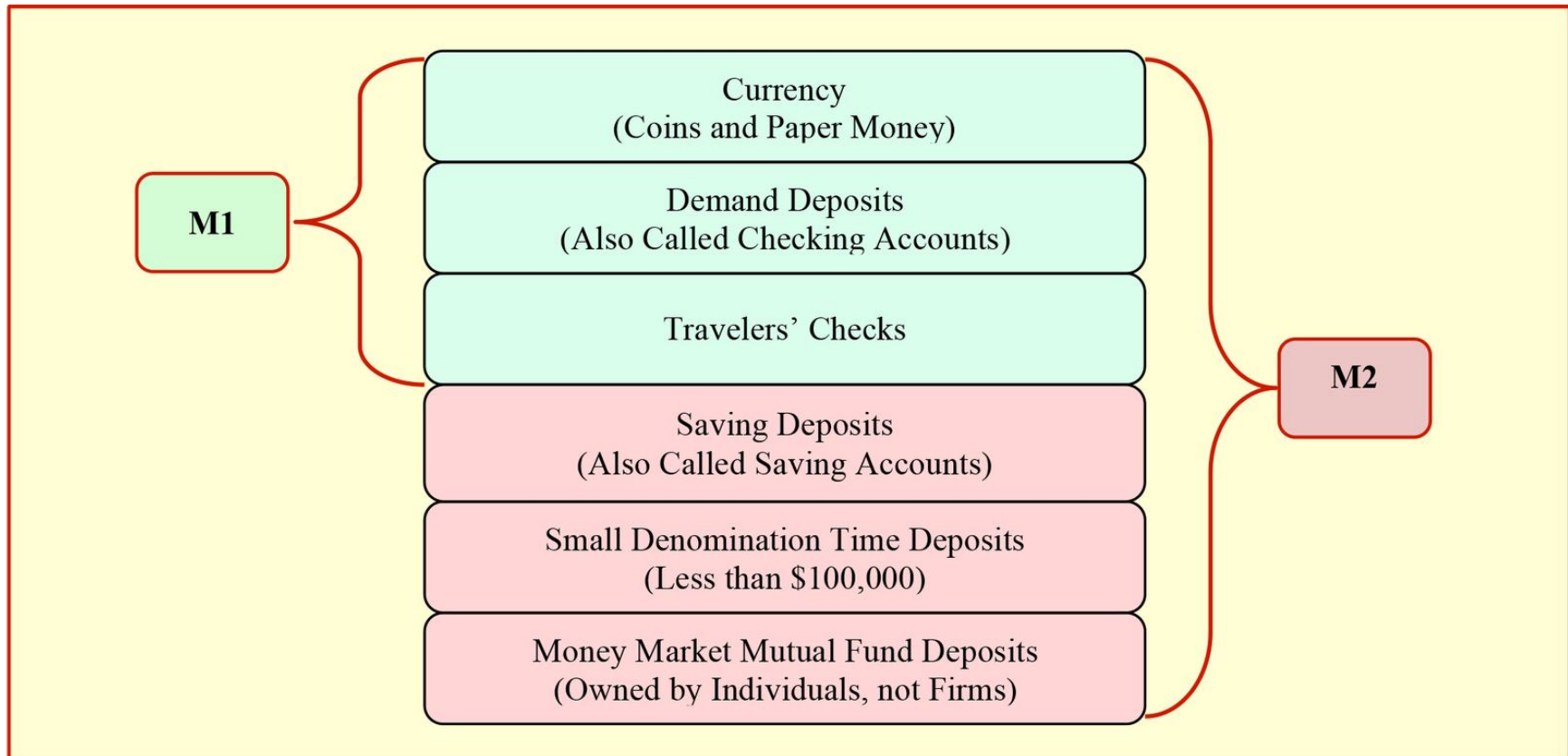**Problem 1.** Match things.

(a) store of value

(b) fiat money

(c) medium of exchange

(d) unit of account

(e) commodity money

 (i) the function of money that refers to money's usefulness as an asset

 (ii) type of money that has no intrinsic value, but is still used as a means of payment

(iii) function of money that allows the avoidance of the double coincidence of wants problem associated with the barter system, i.e. facilitates transactions

(iv) function of money that allows prices to be easily expressed according to a standard measure

 (v) type of money that has other uses besides serving as money, and thus has intrinsic value

Answer 1. I got lazy—they match in the order in which they're written.

Problem 2. Given the following components of the money supply, find M1 and M2.

currency	3
travelers' checks	1
demand deposits	6
savings deposits	10
small denomination time deposits	30
individual money market mutual funds	50

Answer 2. There are two primary measures of money. **M1** consists of the most liquid forms of money. **M2** consists of slightly less liquid forms of money, in addition to everything in M1.

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M1 ──┬── Currency
     │   (Coins and Paper Money)
     │
     ├── Demand Deposits
     │   (Also Called Checking Accounts)
     │
     └── Travelers' Checks
                                          ── M2
         Saving Deposits
         (Also Called Saving Accounts)

         Small Denomination Time Deposits
         (Less than $100,000)

         Money Market Mutual Fund Deposits
         (Owned by Individuals, not Firms)
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$$M1 = \$3 + \$1 + \$6 = \$10,$$

$$M2 = M1 + \$10 + \$30 + \$50 = \$100.$$

Problem 3. Abigail withdraws $100 from her savings account and deposits it in her checking account. As a result

(a) M1 remains unchanged, M2 decreases

(b) M1 remains unchanged, M2 increases

(c) M1 decreases, M2 remains unchanged

(d) M1 decreases, M2 decreases

(e) None of the above

Answer 3: e. The money in the savings account wasn't part of M1, but now that it's in a checking account it is part of M1. So M1 in increases. However, that money is part of M2 in either case, so M2 doesn't change.

Problem 4. Match even more! Do it!

(a) discount loan

(b) discount rate

(c) required reserve ratio

(d) open market operations

 (i) money banks borrow from the Fed

 (ii) the rate of interest charged on loans made by the Fed discount rate

(iii) a fraction of deposits banks are required not to loan out required reserve ratio

(iv) the Fed's purchases and sales of government bonds

Answer 4. I got lazy again—they match in the order they're written again.

Required Reserves. Here's how it works. Suppose the required reserve ratio is 10%, and suppose people put $1000 into the bank as demand deposits. Then the bank must keep 10% of that $1000, i.e. $100. They can loan out the remaining $900.

Open Market Operations. If the Fed buys a bond from the public, then the public receives cash and the Fed receives a bond. This means that there is now money circulating in the economy that wasn't circulating before. *So an open market purchase increases the money supply.* This is the Federal Reserve's primary tool for controlling the money supply.

   If the Fed sells a bond to the public, then the Fed gives the public a bond but takes away the cash. Now there's less money circulationg in the economy. *So an open market sale decreases the money supply.*

Problem 5. Match match match match? Match match match match.

(a) balance sheet

(b) required reserves

(c) excess reserves

(d) fully loaned out

(i) statement of assets, liabilities, and net worth

(ii) minimum amount of cash that banks must hold at all times

(iii) the amount of cash that banks might hold in excess of what is required by the Fed

(iv) banks are said to be this when they have no excess reserves

Answer 5. Hey guess what, they're in the same order again.

Consider the example from before. Suppose the required reserve ratio is 10%, and suppose people put $1000 into the bank as demand deposits. Then the bank must keep 10% of that $1000, i.e. $100. They can loan out the remaining $900.

If the bank does loan out that entire $900 that they're allowed to loan out, then they are **fully loaned out.** If they only lend out $800 of it, then they have $100 in **excess reserves**.

Problem 6. The required reserve ratio is 10%. Assume that the bank is fully loaned out. What is the bank's net worth?

Assets		Liabilities and Net Worth	
Reserves	?	Deposits	300,000,000
Treasury Bonds	5,000,000	Borrowing	15,000,000
Loans	350,000,000	Net Worth	?

Answer 6. The bank has deposits of 300,000,000. They're required to hold onto 10% of of it, i.e. 30,000,000. We're told that the bank is fully loaned out, so we can conclude that they hold reserves of 30,000,000. Then the net worth is calculated as

$$\text{net worth} = \text{assets} - \text{liabilities}$$

$$= (30,000,000 + 5,000,000 + 350,000,000) - (300,000,000 + 15,000,000)$$

$$= 70,000,000.$$

Assets		Liabilities and Net Worth	
Reserves	30,000,000	Deposits	300,000,000
Treasury Bonds	5,000,000	Borrowing	15,000,000
Loans	350,000,000	Net Worth	70,000,000

Note that net worth is sometimes called **bank capital**. It represents the amount that belongs to the bank's shareholders. Banks are required by law to hold a minimum amount of bank capital. This is for the two reasons: to prevent excessive risk taking, and to ensure that the bank has enough money to pay its depositors or creditors in case some of the bank loans default.

Problem 7.   Consider the initial balance sheet below. Subsequently the bank sells $6 million worth of treasury bonds to the Fed. Update the balance sheet accordingly.

Initial Bank Balance Sheet				
Assets			**Liabilities + Net Worth**	
Uses of Funds			Sources of Funds	
Reserves			Deposits	$140,000,000
Required		$14,000,000		
Excess		$13,000,000		
Treasury Bonds		$37,000,000	Borrowing	$18,000,000
Loans		$136,000,000	Net Worth	$42,000,000
Total		**$200,000,000**	**Total**	**$200,000,000**

Answer 7.   We should see T-bonds fall by $6m, from $37m to $31m. Reserves should increase by $6m. Since this new $6m does not constitute new deposits, it means these are new excess reserves. The liabilities column is unchanged.

Option B

Bank Balance Sheet				
Assets Uses of Funds			**Liabilities + Net Worth** Sources of Funds	
Reserves			Deposits	$140,000,000
Required		$14,000,000		
Excess		$19,000,000		
Treasury Bonds		$31,000,000	Borrowing	$18,000,000
Loans		$136,000,000	Net Worth	$42,000,000
Total		**$200,000,000**	**Total**	**$200,000,000**

Problem 8. Suppose the Fed purchases $100 worth of Treasury bonds. The banking system is fully lent out and will continue to lend out all of its excess reserves. Suppose also that the required reserve ratio is 10%. How much deposits will be created in the banking system?

Answer 8. The money multiplier equation is

$$\$100 \times \frac{1}{0.10} = \$100 \times 10 = \$1000.$$

So, if the banks decide to lend out everything they can—i.e. to hold no excess reserves—then $1000 will be created in the banking system. If the banks choose to hold on to excess reserves, then less than $1000 will be created.

Since banks are "playing with other people's money," including yours, the FDIC insures your deposits for up to $250000. So if the bank makes bad loans and goes bankrupt, you're not completely out of luck. But this also incentivizes banks to be more risky, since they know the government will bail them out if they make bad loans. This is called **moral hazard**.

Problem 9.   Which of the following is considered an expansionary monetary policy?

(a) an increase in the required reserve ratio

(b) an increase in the discount rate

(c) an open market sale

(d) an open market purchase

(e) none of the above

Answer 9: d. The simplistic, not 100% accurate, yet reliable, way of thinking about it is, "will this action increase or decrease lending in the economy?" If it increases lending, then it will also increase the money supply, so think of this case as being expansionary. If it decreases lending, then contractionary.

(a) An increase in the required reserve ratio means banks have to hold on to more of their deposits, and thus cannot lend out as much. So it is contractionary.

(b) An increase in the discount rate means banks don't want to borrow as many reserves from the Federal Reserve, and thus have less to lend out. So it is contractionary.

(c) An open market sale means the Fed sells a bond to a bank in exchange for cash. So the banks are paying for that bond with reserves. Since the banks have fewer reserves, they can't lend out as much. So this is contractionary.

(d) An open market purchase means the Fed buys a bond to a bank in exchange for cash. So the Fed is paying for those bonds with cash. Since the banks have more reserves, they can lend out more. So it is expansionary.

Problem 10. The required reserve ratio is 10% and banks want to hold some additional excess reserves. The Fed conducts an open market purchase worth $1 million. Which is the following statements is true?

(a) the money supply will increase by less than $10 million

(b) the money supply will increase by exactly $10 million

(c) the money supply will increase by more than $10 million

(d) the money supply will decrease by $10 million

(e) none of the above

Answer 10: a. When we calculate the money multiplier, we use the ratio of reserves that are *actually* being lent out. Banks might choose to hold on to, say, 20% of their reserves, even though they are only legally required to hold onto 10%. So then the effect of the open market purchase will be

$$\$1m \times \frac{1}{0.20} = \$5m.$$

Only if banks are *fully lent out* will we use the required reserve ratio in the money multiplier calculation; in this case the money supply could increase by $10m$.