UNIT 6 – 1

What is a Mortgage?

A mortgage is a legal document that pledges *property* to the lender as security for payment of a *debt*. In the case of a home mortgage, the *debt* is the money that is borrowed to purchase a home. The *property* is the home itself.

The most common **duration**, or length, of a mortgage is 30 years because longer mortgages usually have lower monthly payments. Some mortgages have a duration of 40 years, but they are used less frequently because people do want to get the home paid off sometime. And, if someone wants to pay the home somewhat faster, then they might even ask for a 10- or 15-year mortgage. Mortgages are usually issued in increments of 5 years, so it helps to know all you can about a mortgage before you sign up for one.

The size of the payment, of course, is determined by the amount borrowed and the length of the mortgage. However, the borrower can cause small changes in the size of the monthly payment by simply changing the duration of the mortgage.

In this unit we are going to explore several topics. First of all, we'll give you a conceptual way to think about your mortgage. Then, we'll explore issues like the size of the monthly payment and the overall duration of the mortgage. Once you have these basics down, you can explore the differences between the fixed rate and the variable rate mortgage in the next section.

Case Study Application:

Before we begin our explanation of the mortgage, we'd like for you to review the case study at the top of the next page. In the case study, a couple, perhaps much like yourself or someone else you know, face the problem of understanding the details of a home mortgage. Then, as you read each of the sections that follow, see if you can use the information you learned to help Bill and Rhonda solve their problem.

CASE STUDY: BILL AND RHONDA'S DILEMMA

Bill and Rhonda have a combined income of $86,000 and they want to buy a home that will require a modest $140,000 mortgage. They have saved enough money for the down payment, and so their problem now is to figure out how much they will have to pay monthly, and how long they will have to make the payments.

After talking to several local lenders, Bill and Rhonda found that their best deal was an 8% fixed rate, 30-year mortgage that would result in a monthly payment of "about" $1,050. They could actually afford to make a slightly higher monthly payment, but the lender just gave him the single approximation for the 30-year loan.

The loan officer promises to get back to the couple in a few days, but they'd really like to know more about their options so that they would be better prepared to discuss the matter the next time they meet.

Visualizing the Mortgage

After you actually get the mortgage, two things will stand out: the size of the monthly payment and the number of payments that have to be made. For example, a $100,000, 30-year, 7% fixed-rate mortgage will require 360 monthly payments of $665.30. A **fixed rate mortgage** is one where the interest rate, and hence the size of the monthly payment, is fixed for the duration of the mortgage.

It sometimes helps to visualize the mortgage as a rectangle as in Figure 6-1 below. Note that the height of the rectangle is the size of the monthly payment, while the length shows the duration of the mortgage.

Figure 6-1: Visualizing the Mortgage
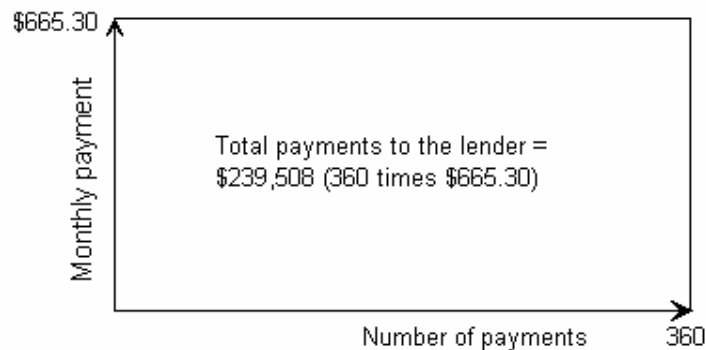
The area of the rectangle (length times width) amounts to 360 months times $665.30, or $239,508, and is the total amount that the borrower will repay the lender over the life of the mortgage. Since the total amount repaid is more than the

$100,000 that was borrowed, the difference of $139,508 represents the total of interest that will be paid on the loan. While this may seem like a lot, we'll soon see that the amount of interest is greatly affected by the duration of the mortgage; it is not just a function of the mortgage interest rate.

- Given Bill and Rhonda's monthly estimate of $1,050, how much will they pay the lender over the course of the mortgage (use the approximated payment given to them at this time)?

- How much of this total amount will have been paid for interest, and how much for principal?

The Monthly Payment

The $665.30 monthly payment is what is called an **amortized payment**. This means that the payment was estimated in such a way that the payment would be just large enough to cover the monthly interest on the outstanding balance and still reduce the principal by a enough every month to pay it off completely at the end of 30 years.[1] As time goes on, and as the outstanding balance becomes smaller, the part of the payment going to interest becomes smaller, leaving more of the payment to reduce the principal. Figure 6-2 below shows how this balance changes over time.

Figure 6-2: Interest and Principal Repayment Over Time
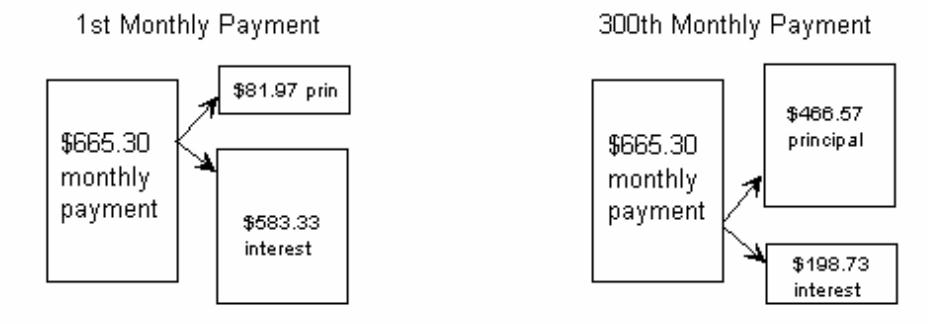
In the figure, you can see that $583.33 of the first $665.30 payment covers interest on the loan, leaving $81.97 to reduce the outstanding principal (the amount still owed). By the time you get to the 300th payment (25 years later), the unpaid balance is much smaller and so the interest drops to $198.73, leaving $466.57 to be used to reduce the outstanding principal. Because this is a simple fixed-rate

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[1] Rather than show you the algebra for this step, we recommend that you use the Kentucky Real Estate Commission mortgage calculator on this site instead. Once you access the calculator, enter 100000 (or $100,000 without the dollar sign and comma) for the amount borrowed, 7 (for 7%) as the stated annual interest, and 30 for the number of years. When these three fields are completed, select "Calculate" to find the monthly payment of $665.30.

mortgage, both the size of the monthly payment and the number of payments over the life of the mortgage both remain fixed.

We'll have to wait until we get to the next section of this unit before we can offer a more specific explanation as to why this happens, but right now we want to keep our focus on the size of the payment.

- Using the mortgage calculator on this site, what will be the <u>actual</u> payment that Bill and Rhonda will make?

- Using this new and more exact payment, and assuming a 30-year fixed rate mortgage, how much will eventually be paid in interest and how much will go for principal?

Selecting the Duration

While the most common duration of a mortgage is 30 years, mortgages in 5-year increments such as 10, 15, 20, 25, 30, 35 and 40-year durations are normally also available. So, the question becomes, which duration is best for you?

Several factors obviously enter into this decision. For example, some people simply don't like debt, and so they prefer a shorter mortgage just to get it paid off early. Someone else may want to time the mortgage so that it is paid off before retirement when their income is likely to be lower, or they may want to have it paid off before their children (or future children) enter college. The point is that there is nothing magic about a 30-year mortgage and so the borrower should examine their options before they sign the contract.

So, while you are thinking about the issues that are important with regard to finally paying off the mortgage, you might want to draw up a table like the one below in <u>Figure 6-3</u> that shows the monthly payment, total amount repaid, amount paid on principal, and total interest payments for a 7%, $100,000 mortgage of different durations. The numbers in the table are easily found using the mortgage calculator on this site.

Figure 6-3: Mortgage Durations and Payments

Mortgage Duration	Monthly Payment	Number of Monthly Payments	Total Payments to Lender
15 years	$898.83	180	$161,789
20 years	$775.30	240	$186,072
25 years	$706.80	300	$212,040
30 years	$665.30	360	$239,508
35 years	$638.86	420	$268,321
40 years	$621.43	480	$298,286

When you examine the table above, several things should stand out. First, longer mortgages have lower monthly payments. Second, the monthly savings to be achieved by having a longer mortgage that are not always that large. For example, the 30-year mortgage in the table above has a monthly payment of $665.30. Adding 5 years to the mortgage may at first sound like a good idea, but all you get is a monthly savings of $26.44 ($665.30 minus $638.86) – *and,* you get to make 60 extra payments of $638.86.

Finally, it should be evident that you can pay a lot more to the lender for a long mortgage than a shorter one. If you have a 15-year mortgage, you will eventually repay $161,789, while a 30-year mortgage requires total payments of $239,508. And, if the mortgage is even longer, then you will repay even more.

Because of this, it may make more sense to reduce the 30-year mortgage to 25 years. This would increase the payment by $41.50, but it would also mean 60 fewer monthly payments.

The moral of the story is this: Before you decide on a fixed rate mortgage of a certain duration, take a look at several other maturities just to be sure that you know what your options are. After all, one size mortgage does not fit all.

- Create a brief table for Bill and Rhonda such as the one above that compares mortgages of 15, 20, 25, 30, 35 and 40 years.

- Bill and Rhonda were thinking that they could afford to make a slightly higher payment. Given the information you derived in the table above, what advice would you give them with regard to having a shorter mortgage? Explain your argument.

Tax Consequences of a Mortgage

In America today, the interest paid on a home mortgage is tax deductible. This represents a tremendous advantage to homeowners because it actually lowers the cost of home ownership. This feature of the federal tax code is also the reason why a greater percentage of Americans own homes than in any other country in the world.

But, specifically, what is the tax advantage to you?

The answer is that it depends on your income. Because the personal income tax is a ***progressive tax*** – meaning that upper incomes are taxed at higher tax rates than lower ones – the more you earn, the larger the tax saving.

For example, let's suppose that someone is in the 15 percent tax bracket. That means that every dollar they spend on mortgage interest can be deducted from their federal taxable income, and that they will pay less taxes. So, someone who had $50,000 of taxable income and $1,000 of mortgage interest payment over

the course of the year would only pay taxes on $49,000. The $1,000 they "saved" or protected from taxes would have been taxed at 15 percent, so their saving was actually $150 (or 0.15 times $1,000). On the other hand, someone in the 35 percent tax bracket would have tax savings of $350 dollars for every $1,000 of mortgage interest they paid. In general, then, we could express the tax savings in the following way:

Federal tax savings = (marginal tax bracket)(annual mortgage interest paid)

As for the particular tax bracket that you are in, you would have to consult the 2005 tax rate schedules that are put out annually by the Internal Revenue Service. If we just look at the table for married individuals in Figure 6-4 below, you can see how the marginal tax rates change as levels of income change.[2]

Figure 6-4: 2007 Tax Brackets for Married Individuals Filing Jointly

If taxable income is over--	But not over--	The tax is:
$0	$15,650	10% of the amount over $0
$15,650	$63,700	$1,565.00 plus 15% of the amount over 15,650
$63,700	$128,500	$8,772.50 plus 25% of the amount over 63,700
$128,500	$195,850	$24,972.50 plus 28% of the amount over 128,500
$195,850	$349,700	$43,830.50 plus 33% of the amount over 195,850
$349,700	no limit	$94,601.00 plus 35% of the amount over 349,700

For example, suppose that you and your spouse had a combined income of $135,000 which is in the 28 percent tax bracket. If you had paid $10,000 of mortgage interest during the course of the year, your annual federal tax saving would be $2,800 – or 0.28 times $10,000.

- Which marginal tax bracket are Bill and Rhonda in assuming that the tax rates in the above table apply?

- If Bill and Rhonda were to get a mortgage, and if they paid $10,000 of interest in the first year of the mortgage, what would be their federal tax savings?

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[2] If you search the IRS site at http://www.irs.gov/ for the "200X Tax Rate Schedules" you should be able to find the appropriate schedules for other cases such as married filing separately or single individuals.