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CPI and Indexing

This project will explore how to calculate an index and the how to use that index to examine the relationship between inflation and college tuition. This project will require the use of two data sets. One is found at:

<http://www.colorado.edu/pba/budget/tuitionfees/history.html> and the other is found at <ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt>

Summaries of both data sets are included below.

Undergraduate-Resident Tuition for CU-Boulder*							
Academic Year Beginning in Fall	Tuition		Academic Year Beginning in Fall	Tuition		Academic Year Beginning in Fall	Tuition
1972	\$440		1985	\$1,332		1998	\$2,386
1973	\$458		1986	\$1,466		1999	\$2,444
1974	\$476		1987	\$1,548		2000	\$2,514
1975	\$532		1988	\$1,610		2001	\$2,614
1976	\$578		1989	\$1,714		2002	\$2,776
1977	\$614		1990	\$1,842		2003	\$3,192
1978	\$666		1991	\$1,972		2004	\$3,480
1979	\$694		1992	\$2,080		2005	\$4,446
1980	\$762		1993	\$2,122		2006	\$4,554
1981	\$868		1994	\$2,216		2007	\$5,418
1982	\$982		1995	\$2,270		2008	\$5,922

Mathematical Opportunity Worksheet for CPI & Indexing

1983	\$1,070		1996	\$2,322		2009	\$6,153
1984	\$1,194		1997	\$2,356			

* Rates for the College of Arts and Sciences

Source <http://www.colorado.edu/pba/budget/tuitionfees/history.html>

Average Annual Consumer Price Index (1982-1984 = 100)							
Bureau of Labor Statistics							
Year	CPI		Year	CPI		Year	CPI
1973	44.4		1985	107.6		1997	160.5
1974	49.3		1986	109.6		1998	163
1975	53.8		1987	113.6		1999	166.6
1976	56.9		1988	118.3		2000	172.2
1977	60.6		1989	124		2001	177.1
1978	65.2		1990	130.7		2002	179.9
1979	72.6		1991	136.2		2003	184
1980	82.4		1992	140.3		2004	188.9
1981	90.9		1993	144.5		2005	195.3
1982	96.5		1994	148.2		2006	201.6
1983	99.6		1995	152.4		2007	207.3
1984	103.9		1996	156.9		2008	215.3

Opportunity 1 explores the concept of an index by using college tuition and how one is calculated.

Opportunity 2 introduces the concept of the Consumer Price Index (CPI) and looks at inflation and “tuition inflation”

Opportunity 3 looks at how to adjust prices for inflation.

Opportunity 1

<p>Calculate the tuition index for a given year using 1989 as the base year. Round each index to one decimal place.</p> $\text{index number} = \frac{\text{value}}{\text{reference value}} \times 100$	Compute the Tuition Index for the following years:	
	Year	TI
	1972	25.7
	1975	31.0
	1980	44.5
	1989	100
	1990	107.5
	2000	146.7
	2009	359

How Opportunity 1 is Coded

- The reference value is static 1714.
- The value will change depending on what year is selected.

In the starter application, you programmed this with the following function:

```
function IndexF1(event:Event):void{
    Index1.text=String(Number(I1.text)/Number(I1.text)*100);
    Index2.text=String(Number(I2.text)/Number(I1.text)*100);
    Index3.text=String(Number(I3.text)/Number(I1.text)*100);
    Index4.text=String(Number(I4.text)/Number(I1.text)*100);
    Index5.text=String(Number(I5.text)/Number(I1.text)*100);
    Index6.text=String(Number(I6.text)/Number(I1.text)*100);
}
```

Opportunity 2

<p>Write a program that calculates inflation between any two years using CPI. Specifically, compute the percent inflation between 1974-1975 and between 2007-2008. Round the answer to one decimal place.</p> $\frac{CPI_{Next\ Year} - CPI_{Previous\ Year}}{CPI_{Previous\ Year}} \times 100\% = \% \text{ of Inflation}$ <p>The “tuition inflation” at CU can be determined by using the same formula. Compute the percent “tuition inflation” between 1974-1975 and between 2007-2008. Round the answer to one decimal place.</p> $\frac{TI_{Next\ Year} - TI_{Previous\ Year}}{TI_{Previous\ Year}} \times 100\% = \% \text{ of Tuition Inflation}$	<p>Inflation between 1974-1975 is 9.1%</p> <p>Inflation between 2007-2008 is 3.9%</p> <p>Tuition Inflation between 1974-1975 is 11.8%</p> <p>Tuition Inflation between 2007-2008 is 9.3%</p> <p>Has college tuition been keeping pace with inflation? (Ans: No, it has been increasing higher than inflation).</p>
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How Opportunity 2 is Coded.

- The only static value will be 100%.

You can program the function along the following lines:

```
function CalcInf(year1:Number,year2:Number){
    RInflation.text=String(((year2-year1)/year1).toFixed(1)+"%");
};
```

Opportunity 3

<p>Given a price in dollars for a given year, X, the equivalent price in dollars for year Y, can be found by</p> $price_{Year Y} = (price_{Year X}) \times \frac{CPI_Y}{CPI_X}$ <p>Write a program that calculates the current value of CU tuition for any given year.</p>	<p>Tuition at CU-Boulder was \$458 in 1973. Determine what \$458 is in 2008 dollars. (Ans: \$2220.89)</p> <p>What would the tuition have to be in 1973 dollars to be equal to the 2008 tuition? (Ans: \$1221.26)</p>
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How Opportunity 3 is Coded

- This is the first time the equation will need to be expressed in a different form as students will need to solve for the Price in year X rather than year Y. The formula is

$$price_{Year Y} \times \frac{CPI_X}{CPI_Y} = price_{Year X}$$

You can program the function along the following lines:

```
function CalcMoney(year1:Number,year2:Number){
    MoneyLater.text="$"+String((Number(MoneyStart.text)*year2/year1).toFixed(2));
};
```