1. The 6-month rate on the yield-curve is 1%, the price for a 1-year STRIP is 98.50, the yield to maturity of a 1.5 year STRIP is 1.8%, and the yield to maturity of a 1.5 year coupon bond is 1.7%. ALL RATES ARE QUOTED AS SEMI-ANNUALLY COMPOUNDED APR’s. What is the price a 3.6% coupon 1.5 year Treasury bond with semi-annual coupons (the next coupon is due in 6 months)? [2]

Since it is a 3.6% coupon bond with semi-annual payments, it pays $36 per year, as $18 every 6 months and then pays $1000 at maturity as well. The total cash flows are:

<table>
<thead>
<tr>
<th>Now</th>
<th>6 months</th>
<th>1 year</th>
<th>1.5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>18</td>
<td>1018</td>
<td></td>
</tr>
</tbody>
</table>

The 1-year rate is 1% APR, so it is 0.005 per 6 months.
The price of a one-year STRIP tells us that $100 in 1 year is worth $98.50 today, so $1 is worth $0.9850 today.
We are given two rates to consider for the 1.5 year cash flow. One is the YTM of a 1.5 year STRIP, which is exactly what we want—the market rate for a single cash flow coming in 1.5 years. The YTM of the coupon bond is a blend of the market rates for cash flows coming every 6 months over the next 1.5 years (a blend of 3 different market rates), so it is not the correct rate to use to discount a single cash flow coming in 1.5 years (the 1018 final payment). A 1.8% APR translates into 0.009 per 6 months. Armed with that information, we can price the bond:

\[ \text{Price} = PV = \frac{18}{(1.005)^2} + 18(0.985) + \frac{1018}{(1.009)^3} = 17.91 + 17.73 + 991.00 = 1026.64 \]

2. If the inflation rate is 2.4% APR, compounded monthly, and the nominal rate is 5% APR, compounded semi-annually, what is the real effective annual rate? [2]

\[ 0.024/12 = 0.002, \text{ so EAR for inflation} = (1.002)^{12}-1 = 0.024266 \]
\[ 0.05/2 = 0.025, \text{ so EAR for nominal} = (1.025)^{2}-1 = 0.050625 \]
\[ (1+\text{Real}) = (1+\text{Nominal} / 1 + \text{Inflation}) = 1.050625/1.024266 = 1.025735, \text{ so real} = 0.025735 \]

3. Why shouldn’t you use IRR to choose between projects? [2]

You could give many different answers here. The main thing to convey is that the IRR is just a rate of return and is meaningless without reference to the basis of the return (e.g. 10% on $1 billion or 10% on $100?). This means that a ranking of projects based on IRR does not say which one creates the most value. Just listing the times that IRR fails to rank projects correctly (e.g. different initial investments, different lives, different timing, cash flow sign changes) without explaining how these issues result in a problem does not get full credit.