Math 34: Fall 2014  
Section 8.1 (Basic Principles of Retirement Planning)

• Defined Benefits Plan

  – *Defined Benefits Plan (DB)*: provides a set income in retirement.

  – The amount of money is usually based on a formula involving any of:
    * Preretirement earning
    * Years worked
    * Retirement Age
    * How long payments are guaranteed
    * (There are often maximum on the amount you can earn or minimums on the number of years of service needed)

  – You need to be told the particular formula each plan/company is using.
  – *pension* often refers to DB plan.

• Defined Contribution Plan

  – *Defined Contribution Plan (DC)*: employer contributes money to a retirement account for each employee on the basis of some set formula.

  – (the employee may be required or have the option to contribute money also)

  – The contributed money is invested, and hopefully grows, and then the employee will have the assets in the account to use in retirement.

  – Again, different plans/companies have different plans, so you’ll need to be given the formula for that specific plan/company.

  – *matching*: Often the formulas will indicate that the employer’s contribution is some percent of the employees contribution. These are called matching.
• Vesting
  – After a certain number of years of service you become *vested* which means any benefits earned can’t be lost.
  
  – Vesting determines what happens to benefit’s you’ve earned if you leave your job (early).
    * It could all go back the employer (0% vested)
    * It could all go back to you (Vested or 100% vested)
    * Some of it could go to you, some could go back to the employer (e.g. 60% vested)
  
  – The money you contribute (and earnings on that money) are always yours to keep (take with you) when you leave your job.

• Cliff Vesting
  * You don’t have access to any benefits before a certain date, then you get access to all of them.
  * 5 Year Cliff Vesting

<table>
<thead>
<tr>
<th>Years of Service Completed</th>
<th>Vesting Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 years</td>
<td>0%</td>
</tr>
<tr>
<td>5+ years</td>
<td>100%</td>
</tr>
</tbody>
</table>

• Step Vesting
  * Step-vesting: tells what percent of benefits you are entitled to when you leave and depends on your years of service
  * 7-year 20% Step Vesting

<table>
<thead>
<tr>
<th>Years of Service Completed</th>
<th>Vesting Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 years</td>
<td>0%</td>
</tr>
<tr>
<td>3 – 4 years</td>
<td>20%</td>
</tr>
<tr>
<td>4 – 5 years</td>
<td>40%</td>
</tr>
<tr>
<td>5 – 6 years</td>
<td>60%</td>
</tr>
<tr>
<td>6 – 7 years</td>
<td>80%</td>
</tr>
<tr>
<td>7+ years</td>
<td>100%</td>
</tr>
</tbody>
</table>
1. A certain beverage company offers some of its employees a defined benefits plan beginning at age 65. Their formula states that any employee with at least 5 years of service will revive a monthly payment of 1.15% of their average monthly earnings at the company (at the time of retirement), times the number of years of (qualifying) service to the company.

If an employee’s average monthly earnings were $2900, how much would that employee receive if they had....

(a) 4 years of qualifying service
(b) 10 years of qualifying service
(c) 30 years of qualifying service?

2. Another Company has a DB plan that provides benefits to their employees beginning at age 65. Their formula states that any employee with at least 4 years of service will receive payments of 2% of their average earnings on the last 3 years of the job for each year of service, up to a maximum of 65%.

Gail has worked for Another Company for 16 years, for the last 3 years his salaries were $37,500, $39,000 and $39,000. What is Gail’s pension benefit?

3. One of the Penn State retirement plan options is that the company contributes 9.29% of the employee’s salary, provided the employee contributes at least 5%. If an employee makes $65,000 per year, how much is contributed to the account if they contribute:

(a) 5% of their yearly salary
(b) 7% of their yearly salary

4. Dr. Sue’s Dental Office has a retirement plan where the employer will contribute 3% of an employees annual earnings provided the employee contributes any amount to their plan. They will also match 50% of the employees contributions up to a maximum of 10% of the employees income (this is in addition to the 3% stated earlier.)

Elizabeth is a Dental Hygienist who works for Dr. Sue’s Dental Office, and makes $45,000 a year.

How much will go into Elizabeth’s retirement account this year if she contributes:

(a) nothing
(b) 1% of her yearly salary
(c) 6% of her yearly salary
(d) 11% of her yearly salary
5. Anna has just been laid off. She was covered by the companies’ DB plan which (for any employee with more than 3 years of service) provided $75 a month per year of service, up to a maximum monthly payment of $2000 a month. Anna worked there for 6 years. If her company uses the 7-year 20% Step Vesting schedule above, how much income will Anna get each month (once she reaches retirement age)?

6. Albert is leaving a job he was working at for $4\frac{1}{2}$ years. His company used a DC plan. Albert’s contributions accumulated a total of $6,374.94, and his company’s contributions accumulated a total of $5,644.02.

   (a) Find Albert’s vested balance in this plan if his company used a 5 year cliff vesting schedule.

   (b) Find Albert’s vested balance in this plan if his company used a 3 year cliff vesting schedule.

   (c) Find Albert’s vested balance in this plan if his company uses the vesting schedule below:

<table>
<thead>
<tr>
<th>Years of Service Completed</th>
<th>Vesting Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 years</td>
<td>0%</td>
</tr>
<tr>
<td>3 – 4 years</td>
<td>25%</td>
</tr>
<tr>
<td>4 – 5 years</td>
<td>50%</td>
</tr>
<tr>
<td>5 – 6 years</td>
<td>75%</td>
</tr>
<tr>
<td>6+ years</td>
<td>100%</td>
</tr>
</tbody>
</table>