1. Insert 3 into the splay tree above. (30P)

```
int Hash (char* key)
{
    int sum = 0;
    for (int j=0; j<4; j += 2)
        sum += 4*key[j] + key[j+1];
    sum = sum % 11;
    return sum;
}
```

2. Write words from dictionary.txt to relative.txt using Hash() function to calculate relative addresses and linear probing as a collision resolving method. In addition, add related words to linked lists using synonym chaining method. (30P)

<table>
<thead>
<tr>
<th>relative.txt</th>
<th>a-97</th>
<th>n-110</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>b-98</td>
<td>o-111</td>
</tr>
<tr>
<td>1</td>
<td>c-99</td>
<td>p-112</td>
</tr>
<tr>
<td>2</td>
<td>d-100</td>
<td>q-113</td>
</tr>
<tr>
<td>3</td>
<td>e-101</td>
<td>r-114</td>
</tr>
<tr>
<td>4</td>
<td>f-102</td>
<td>s-115</td>
</tr>
<tr>
<td>5</td>
<td>g-103</td>
<td>t-116</td>
</tr>
<tr>
<td>6</td>
<td>h-104</td>
<td>u-117</td>
</tr>
<tr>
<td>7</td>
<td>i-105</td>
<td>v-118</td>
</tr>
<tr>
<td>8</td>
<td>j-106</td>
<td>w-119</td>
</tr>
<tr>
<td>9</td>
<td>k-107</td>
<td>x-120</td>
</tr>
<tr>
<td>10</td>
<td>l-108</td>
<td>y-121</td>
</tr>
<tr>
<td>ASCII Table </td>
<td>m-109</td>
<td>z-122</td>
</tr>
</tbody>
</table>
bool empty() {
    return (header->next == trailer);
}

void addFront(const int& i) {
    add(header->next, i);
}
void add(DoublyNode* v, int& i) {
    DoublyNode* u = new DoublyNode;
    u->score = i;
    ....
    ....
    ....
}
void main() {
    DoublyLinkedList list;
    list.addFront(750);
    list.addFront(720);
}

3. Taking into account the lines represented by ..... in the function add() answer the following choices:

i) (20P) (You'll loose 5Ps from wrong answer)
If the lines are like these
v->prev->next = u;
v->prev = u;
u->prev = v->prev;
u->next = v;
the linked list will be :
(A) [Diagram]
(B) [Diagram]
(C) [Diagram]
(D) [Diagram]
(E) [Diagram]

ii) (20P)
If the lines are like these
v->prev = u;
v->prev->next = u;
u->prev = v->prev;
u->next = v;
the linked list will be :
(A) [Diagram]
(B) [Diagram]
(C) [Diagram]
(D) [Diagram]
(E) [Diagram]