

VoiceXML Example : Blackjack game

Play against the VoiceXML browser

```
<?xml version="1.0" ?>
<vxml version="2.0" xmlns="http://www.w3.org/2001/vxml">

<property name="inputmodes" value="dtmf"/>
<var name="cards"/> <!-- array of cards -->
<var name="currCard" expr="0"/> <!-- current card -->
<var name="userCards"/> <!-- cards of the user -->
<var name="compCards"/> <!-- cards of computer -->

<script> <![CDATA[
  function shuffle() {
    for (var i = 0; i < 52; i++) {
      cards[i] = i;
    }
    for (var i = 0; i < 51; i++) {
      var j = Math.floor(Math.random()*(52-i))+i;
      var k = cards[i];
      cards[i] = cards[j];
      cards[j] = k;
    }
  }
  function cardDescription (cardNum) {
    var suit = Math.floor (cardNum / 13);
    var rank = cardNum % 13;
    var cardDesc;
    switch (rank) {
      case 0: cardDesc = "2 of "; break;
      case 1: cardDesc = "3 of "; break;
      case 2: cardDesc = "4 of "; break;
      case 3: cardDesc = "5 of "; break;
      case 4: cardDesc = "6 of "; break;
      case 5: cardDesc = "7 of "; break;
      case 6: cardDesc = "8 of "; break;
      case 7: cardDesc = "9 of "; break;
      case 8: cardDesc = "10 of "; break;
      case 9: cardDesc = "jack of "; break;
      case 10: cardDesc = "queen of "; break;
      case 11: cardDesc = "king of "; break;
      case 12: cardDesc = "ace of "; break;
    }
    switch (suit) {
      case 0: cardDesc += "clubs"; break;
      case 1: cardDesc += "hearts"; break;
      case 2: cardDesc += "diamonds"; break;
      case 3: cardDesc += "spades"; break;
    }
  }
}
```

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    return cardDesc;
}
function newCardForUser() {
    userCards[userCards.length] = cards[currCard];
    currCard++;
}
function lastUserCardDesc() {
    return cardDescription(userCards[userCards.length-1]);
}
function newCardForComp() {
    compCards[compCards.length] = cards[currCard];
    currCard++;
}
function lastCompCardDesc() {
    return cardDescription(compCards[compCards.length-1]);
}
function valOfCard (cardNum) {
    var rank = cardNum % 13;
    switch (rank) {
        case 9: return 10;
        case 10: return 10;
        case 11: return 10;
        case 12: return 11;
        default: return rank+2;
    }
}
function valOfCards (c) {
    var val = 0;
    var i;
    var aceNum = 0;
    for (var i = 0; i < c.length; i++) {
        var v = valOfCard(c[i]);
        if (v == 11) aceNum++;
        val += v;
    }
    while (val > 21 && aceNum > 0) {
        val -= 10; // ace can be counted as 1 instead of 11 if needed
        aceNum--;
    }
    return val;
}
function softHand (c) { // are all aces counted as 11?
    var val = 0;
    var i;
    var aceNum = 0;
    for (var i = 0; i < c.length; i++) {
        var v = valOfCard(c[i]);
        if (v == 11) aceNum++;
        val += v;
    }
    while (val > 21 && aceNum > 0) {
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        val -= 10; // ace can be counted as 1 instead of 11 if needed
        aceNum--;
    }
    return aceNum > 0;
}
function valOfUserCards() {
    return valOfCards (userCards);
}
function valOfCompCards() {
    return valOfCards (compCards);
}
function shouldCompTakeCard() { // strategy of the computer
    if (softHand (compCards)) return true;
    var val = valOfCompCards();
    if (val <= 11) return true;
    if (Math.random() < 0.25) return true; // risk
    if (Math.random() < 1/(val-11)) return true;
    return false;
}
]]> </script>

<form id="start">
    <block>
        <prompt>Welcome to blackjack</prompt>
        <script>
            cards = new Array(52);
        </script>
        <goto next="#new_game"/>
    </block>
</form>

<form id="new_game">
    <field name="yesno" type = "boolean">
        <noinput> Hey, don't sleep and say something! </noinput>
        <nomatch> I didn't understand you.</nomatch>
        <prompt>Do you want to play a new game?</prompt>
        <filled>
            <if cond="yesno == 'true'">
                <goto next="#start_game"/>
            <else/>
                <goto next="#end"/>
            </if>
        </filled>
    </field>
</form>

<form id="start_game">
    <block>
        <prompt>
            I am shuffling the cards. We start with two cards for each.
        </prompt>
```

```
<script>
  userCards = new Array;
  compCards = new Array;
  shuffle();
  newCardForUser();
  newCardForUser();
  newCardForComp();
  newCardForComp();
</script>
<prompt>
  You got <value expr="cardDescription(userCards[0])"/>
  and <value expr="cardDescription(userCards[1])"/>.
</prompt>
<goto next="#game_eval"/>
</block>
</form>

<form id="game_eval">
  <block>
    <var name="userVal" expr="valOfUserCards()"/>
    <var name="compVal" expr="valOfCompCards()"/>
    <prompt>Value of your cards is <value expr="userVal"/></prompt>
    <if cond="userVal > 21">
      <prompt>You lost the game.</prompt>
      <goto next="#new_game"/>
    </if>
    <if cond="userVal == 21 || compVal > 21">
      <prompt>Value of my cards is <value expr="compVal"/></prompt>
      <prompt>You won the game!</prompt>
      <goto next="#new_game"/>
    </if>
    <if cond="compVal == 21">
      <prompt>Value of my cards is <value expr="compVal"/></prompt>
      <prompt>You lost the game.</prompt>
      <goto next="#new_game"/>
    </if>
    <goto next="#decision"/>
  </block>
</form>

<form id="decision">
  <field name="userDecision" type = "boolean">
    <noinput> Hey, don't sleep and say something!</noinput>
    <nomatch> I didn't understand you. </nomatch>

    <prompt>Do you want one more card?</prompt>

    <filled>
      <if cond="userDecision">
        <script>newCardForUser();</script>
        <if cond="valOfUserCards() >= 21">
```

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<prompt>
  You got <value expr="lastUserCardDesc()"/>
</prompt>
<goto next="#game_eval"/>
</if>
</if>
<var name="compDecision" expr="shouldCompTakeCard()"/>
<if cond="compDecision == 'true'">
  <script>newCardForComp();</script>
</if>
<if cond="userDecision && compDecision == 'true'">
  <prompt>
    I am giving you <value expr="lastUserCardDesc()"/> and I also take
    a card.
  </prompt>
<elseif cond="userDecision && compDecision == 'false'">
  <prompt>
    I am giving you <value expr="lastUserCardDesc()"/>. I will take
    no card.
  </prompt>
<elseif cond="userDecision == 'false' && compDecision ==
'true'"/>
  <prompt>OK, you don't want a card, but I will take one.</prompt>
<else/>
  <prompt>I also don't want more cards. The game is finished.</prompt>
  <goto next="#game_finished"/>
</if>
<goto next="#game_eval"/>
</filled>

</field>
</form>

<form id="game_finished">
  <block>
    <var name="userVal" expr="valOfUserCards()"/>
    <var name="compVal" expr="valOfCompCards()"/>
    <prompt>Value of your cards is <value expr="userVal"/></prompt>
    <prompt>Value of my cards is <value expr="compVal"/></prompt>
    <if cond="userVal >= compVal">
      <prompt>You won the game!</prompt>
    <else/>
      <prompt>You lost the game.</prompt>
    </if>
    <goto next="#new_game"/>
  </block>
</form>

<form id="end">
  <block>
    I hope you enjoyed the game. Goodbye.
```

```
</block>  
</form>  
  
</vxml>
```

The VoiceXML browser will use the ECMA script to process the game logic. The Blackjack rules are accessible here : [wikipedia](#)

Download : [blackjack.vxml](#)

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